整理番号:99-50103

【書類名】　図　面

【図１】

本　発　明　の　原　理　構　成　図

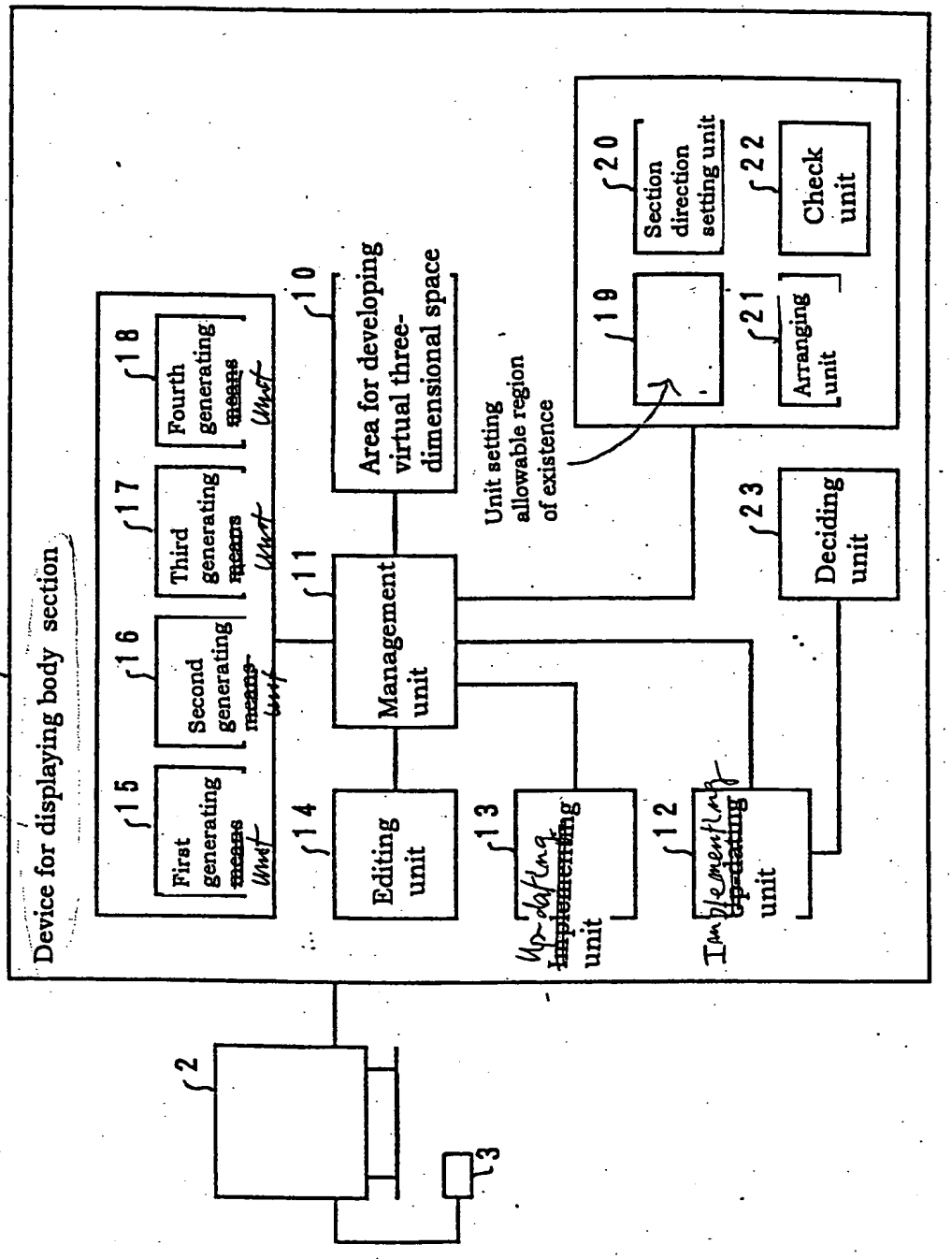


FIGURE 1

【図２】

本 発 明 の 一 実 施 例

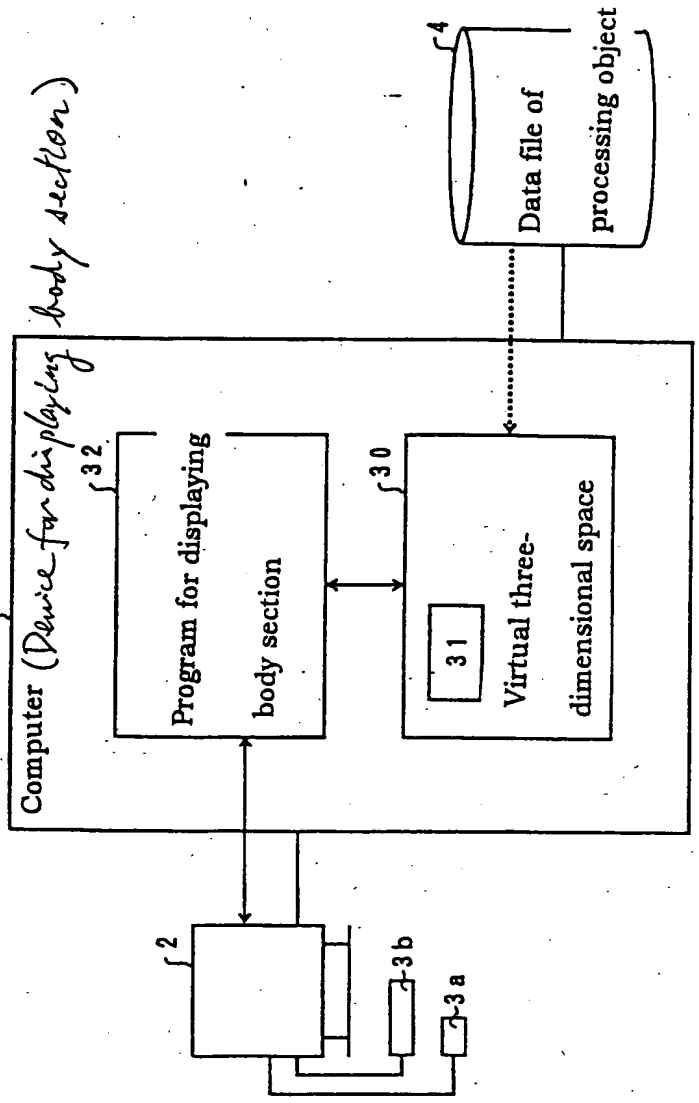


FIGURE 2

Figure 3

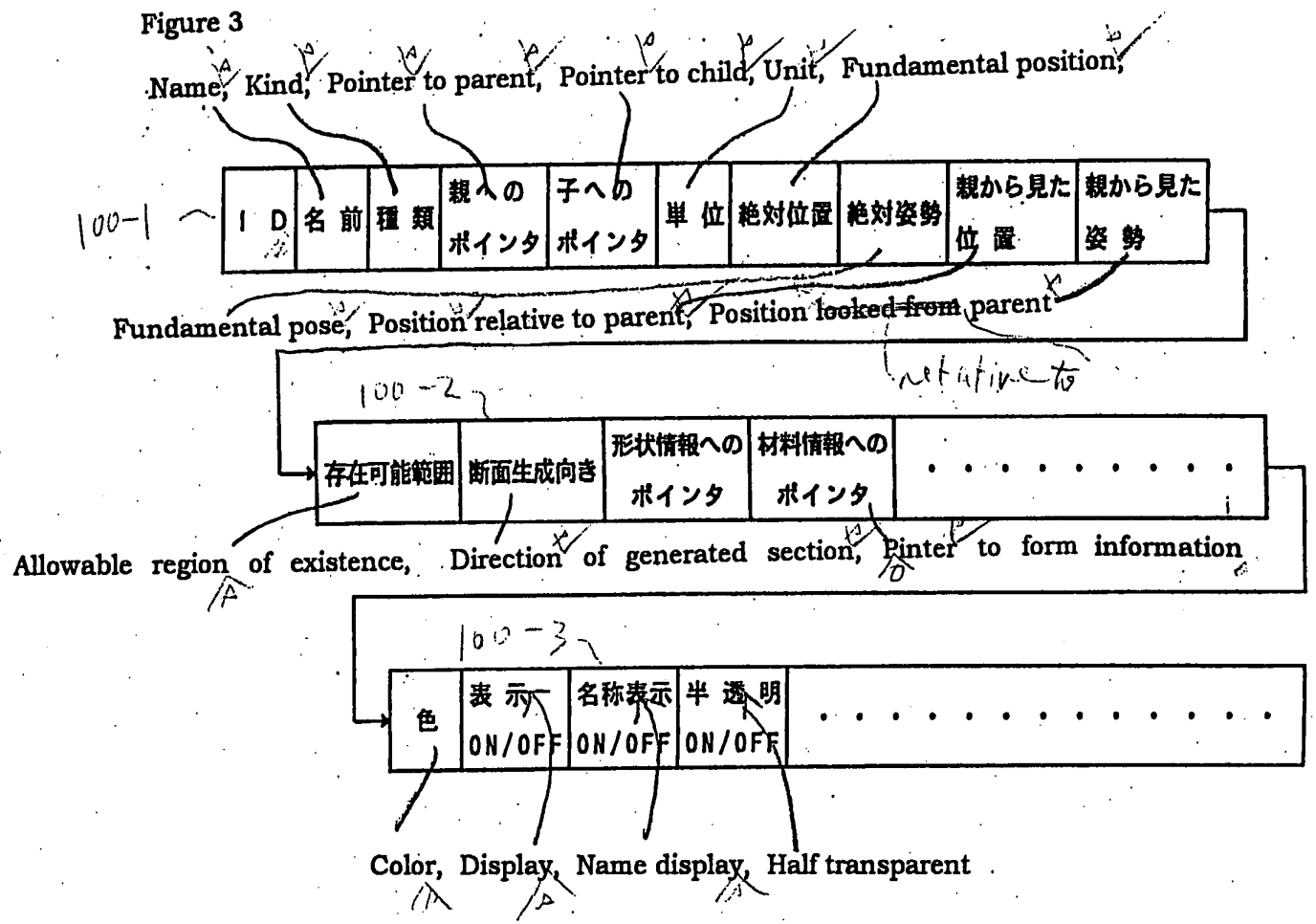


FIGURE 3

【図３】

各画素値毎属性テーブルの説明図

整理番号:99-50103

【図4】

物体断面表示プログラムの処理説明図

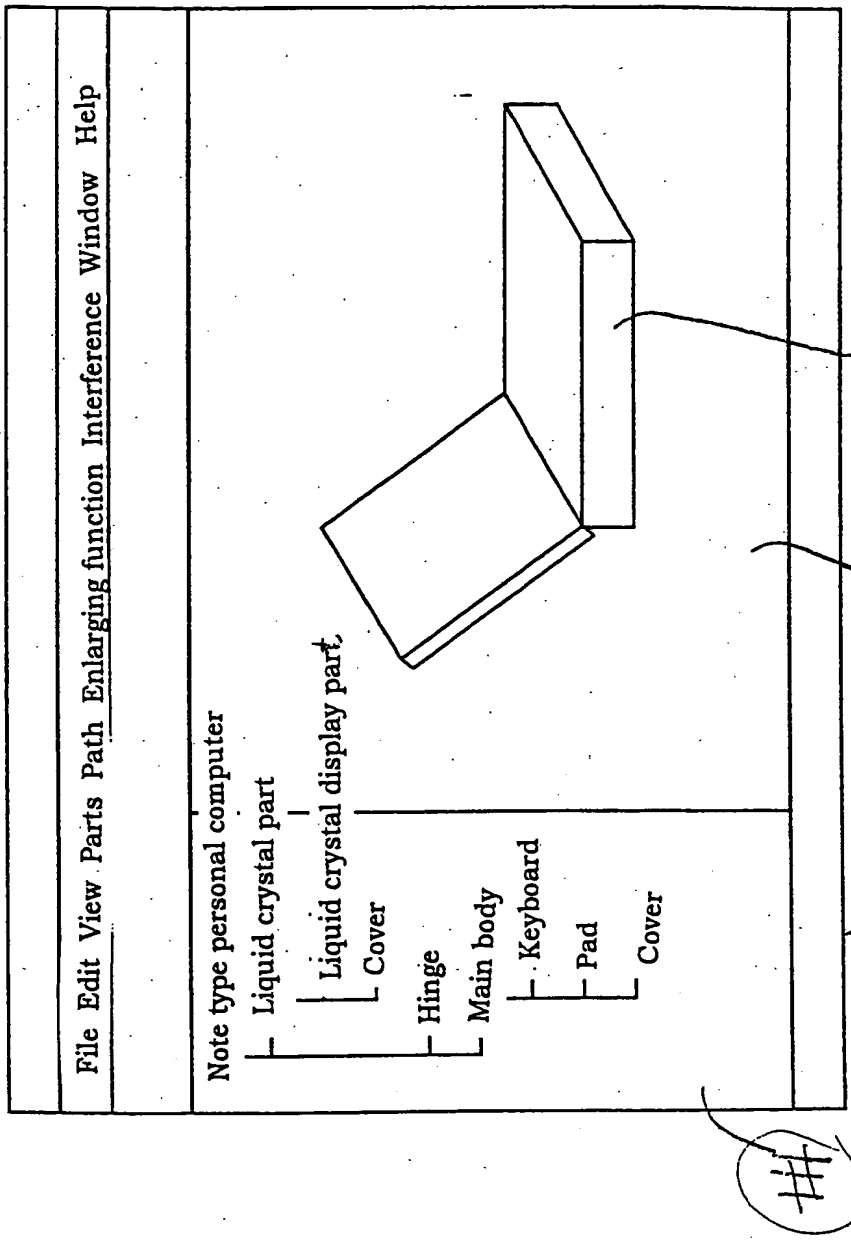
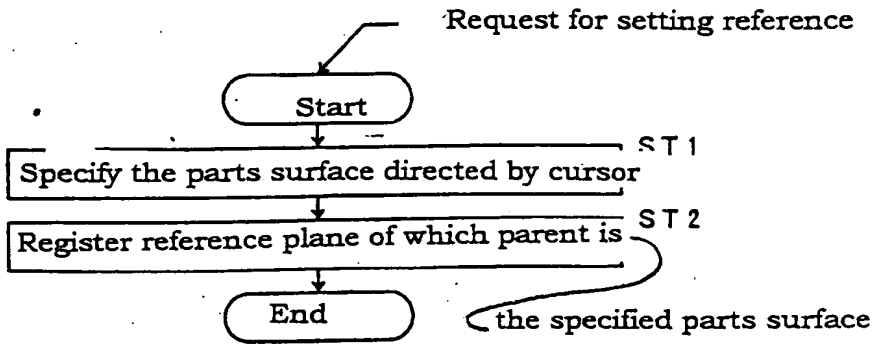


FIGURE 4

【図5】

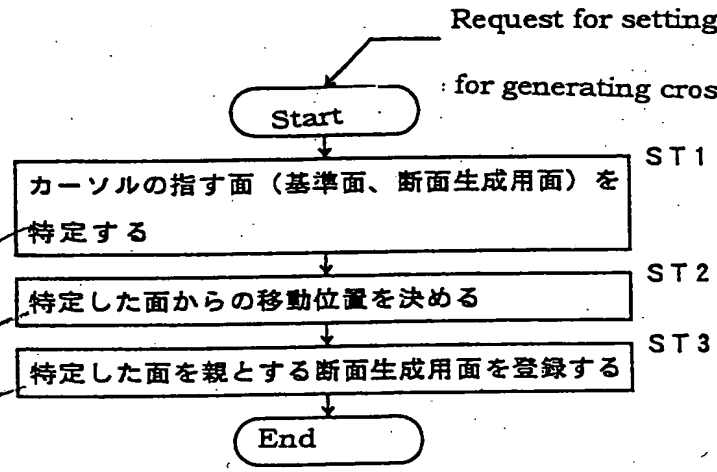
物体断面表示プログラムの処理フロー

Figure 5A



(a)

Fig 5B



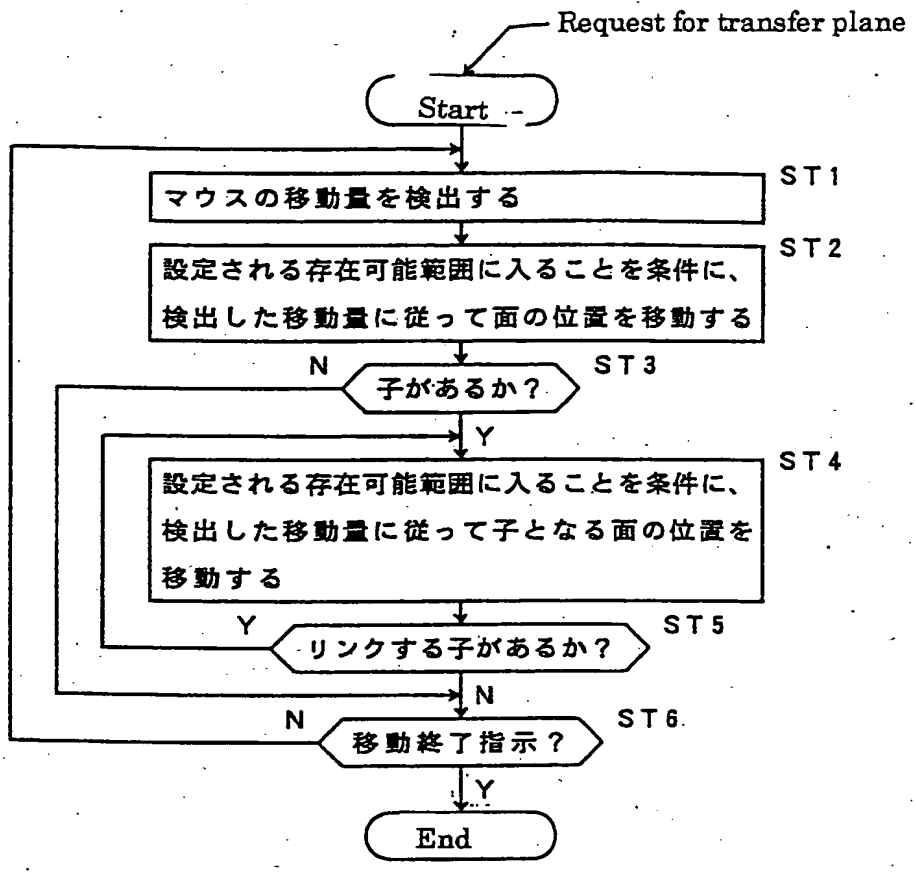
ST1 Specify plane directed by cursor (reference plane, plane for generating section)

ST2 Register plane for generating of which parent is the specified surface

ST3 Register plane for generating of which parent is the specified surface

【図6】

物体断面表示プログラ Figure 6



ST1 Determine movement value of mouse

ST2 Move plane according to the determined moving value, under condition being within the set allowance region of existence

ST3 Is there child ?

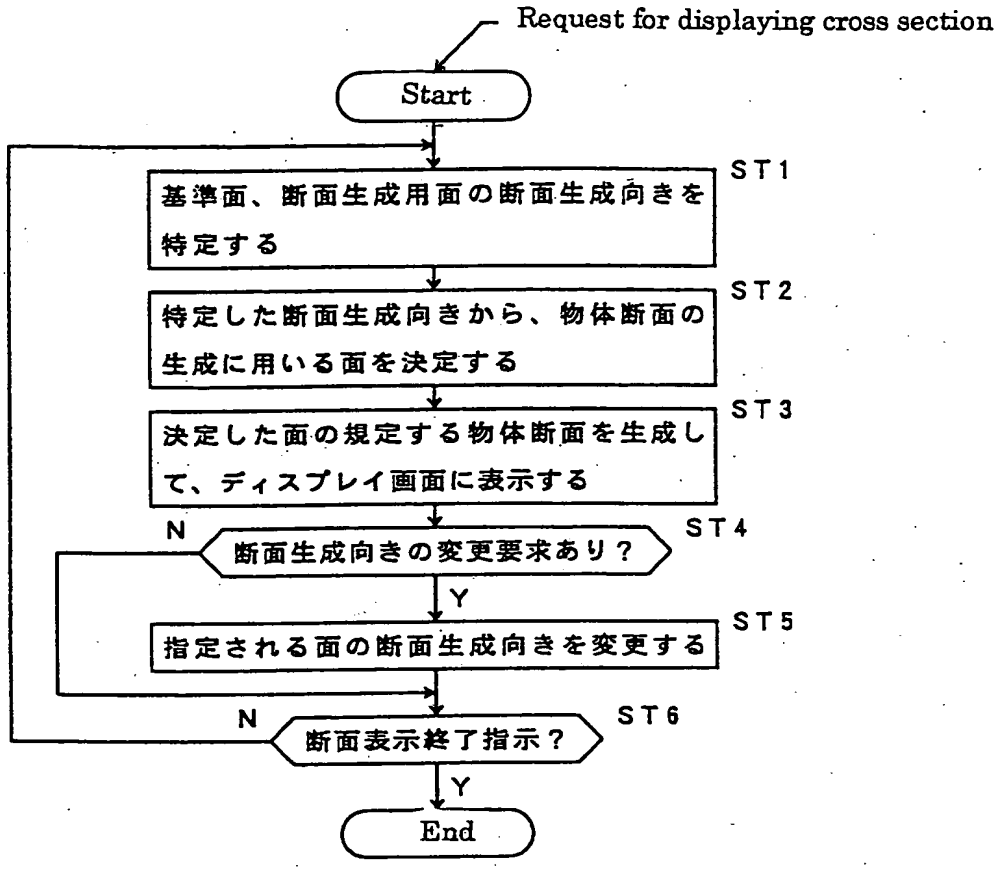
ST4 Move the child plane according to the moving value, under condition being within the set allowance region of existence

ST5 Is there link of child ?

ST6 Direction for ending movement

【図7】

Figure 7



ST1 Specify direction for generating cross section of reference plane, plane for generating cross section

ST2 Determine plane for generating body cross section by the specified direction for generating cross section

ST3 Generate body cross section ruled by the specified plane, and display it

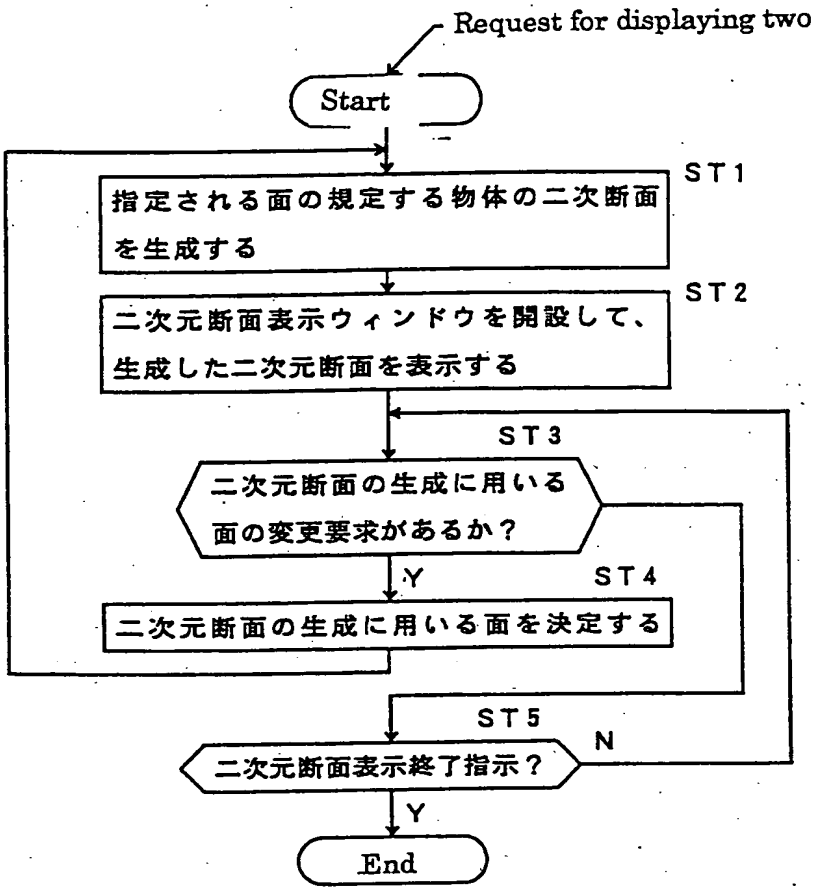
ST4 Is there request for change of direction for generating cross section

ST5 Change direction for generating cross section of specified plane

ST6 Request for ending display of cross section

【図８】

Figure 8



ST1 Generate two dimensional cross section of body ruled by the directed plane

ST2 Open window for displaying two dimensional cross section

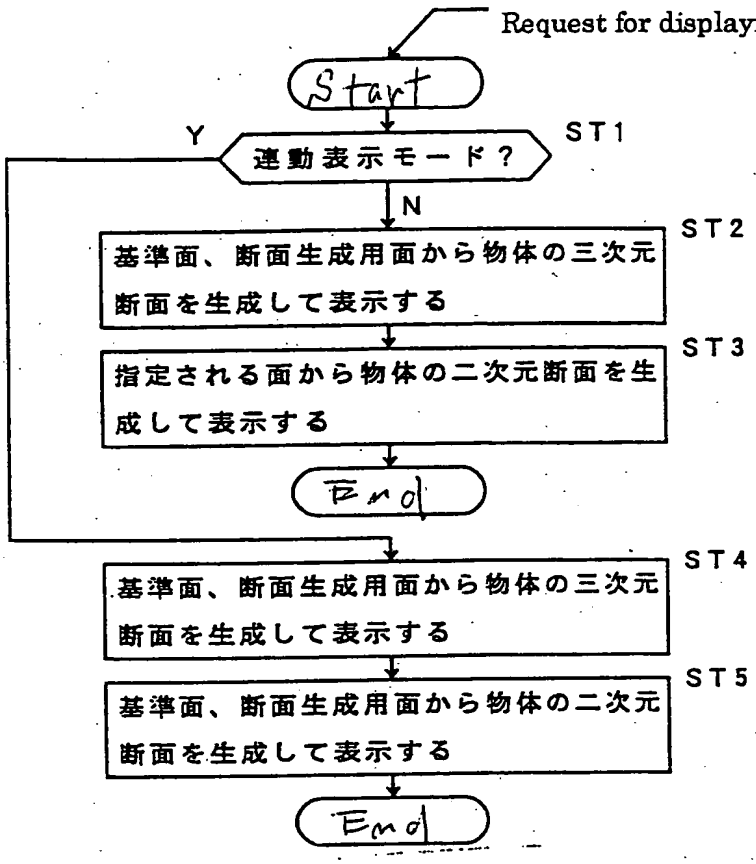
ST3 Is there request for change of plane for generating two dimensional cross section ?

ST4 Determine the plane for generating two dimensional cross section

ST5 Request for ending two dimensional cross section ?

【図９】

Figure 9



ST1 Linking display mode ?

ST2 Generate three dimensional cross section of body by reference plane, plane for generating cross section

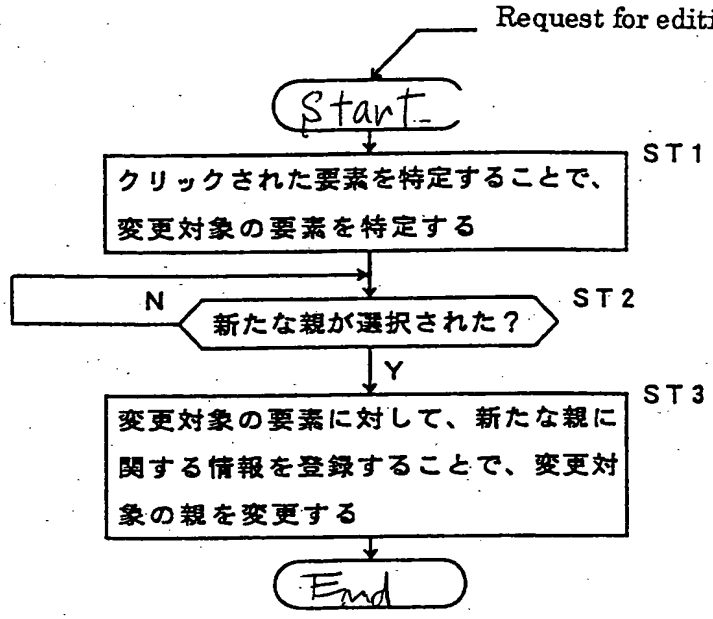
ST3 Generate two dimensional cross section of body by the directed plane

ST4 Generate three dimensional cross section of body by reference plane, plane for generating cross section

ST5 Generate two dimensional cross section of body by reference plane, plane for generating cross section

【図１０】

Figure 10

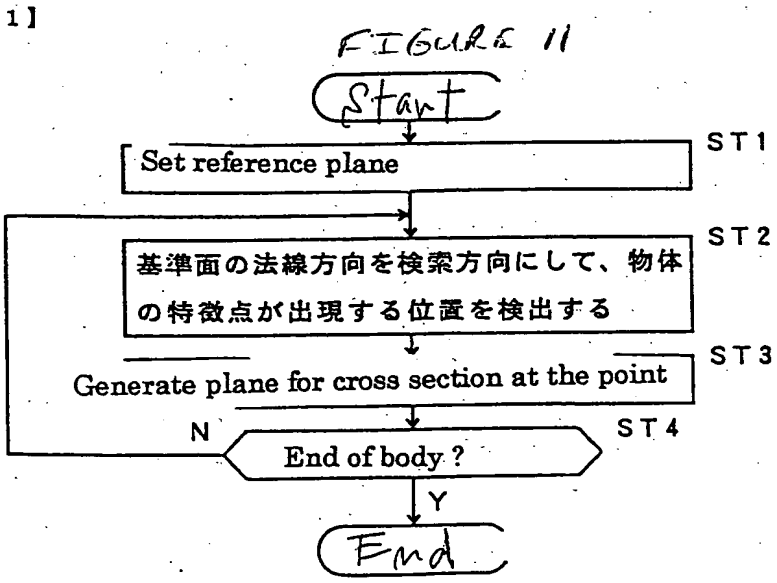


ST1 Specify clicked element, and specify element of change object

ST2 New parent id selected ?

ST3 Change the parent of change object by registering information concerning to the new parent for the element of change object

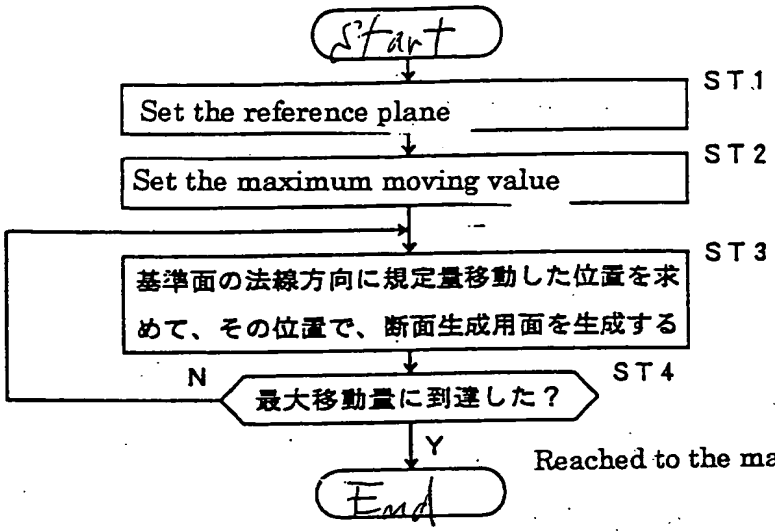
【図１１】



ST2 Determine position appearing of specific point by normal direction of reference plane as detecting direction

【図１２】

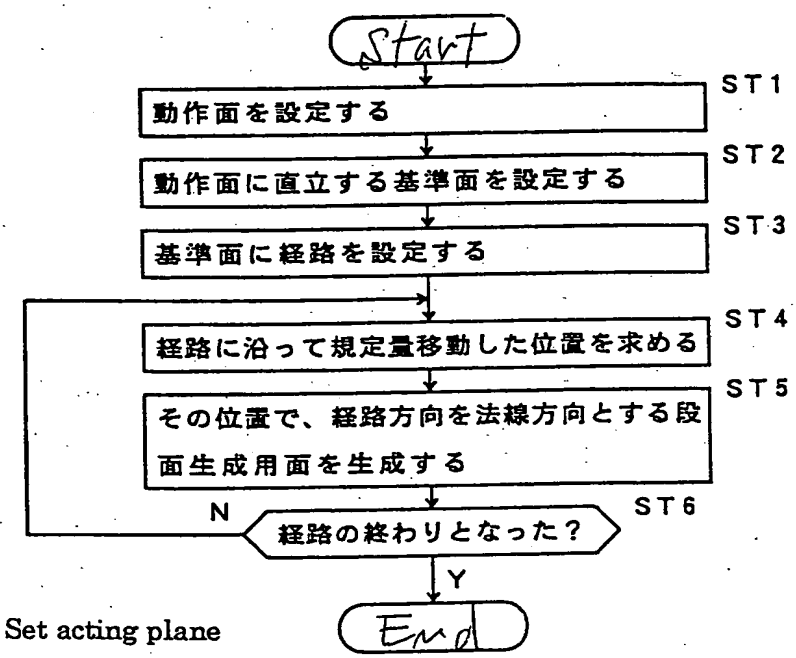
FIGURE 12



Reached to the maximum moving value ?

ST3 Determine a position moved by ruled moving value in direction of normal direction of reference plane

Fig. 13



ST1 Set acting plane

ST2 Set reference plane perpendicular to the acting plane

ST3 Set path on the reference plane

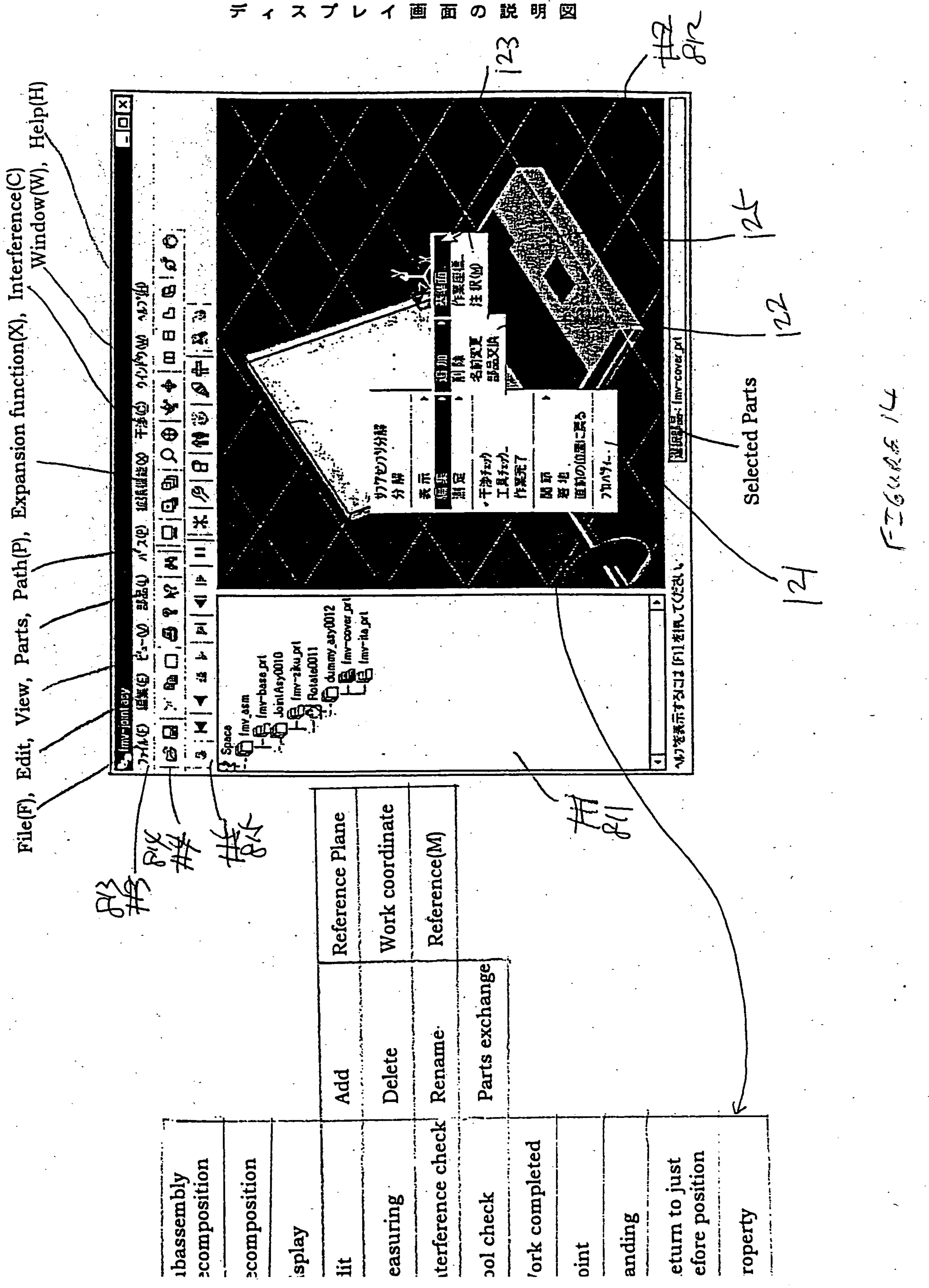
ST4 Determine position moved by ruled value along to the path

ST5 Generate plane for generating cross section of which normal direction is the path direction at the point

ST6 End of path ?

【図１４】

ディスプレイ画面の説明図



【図１５】

ディスプレイ画面の説明図

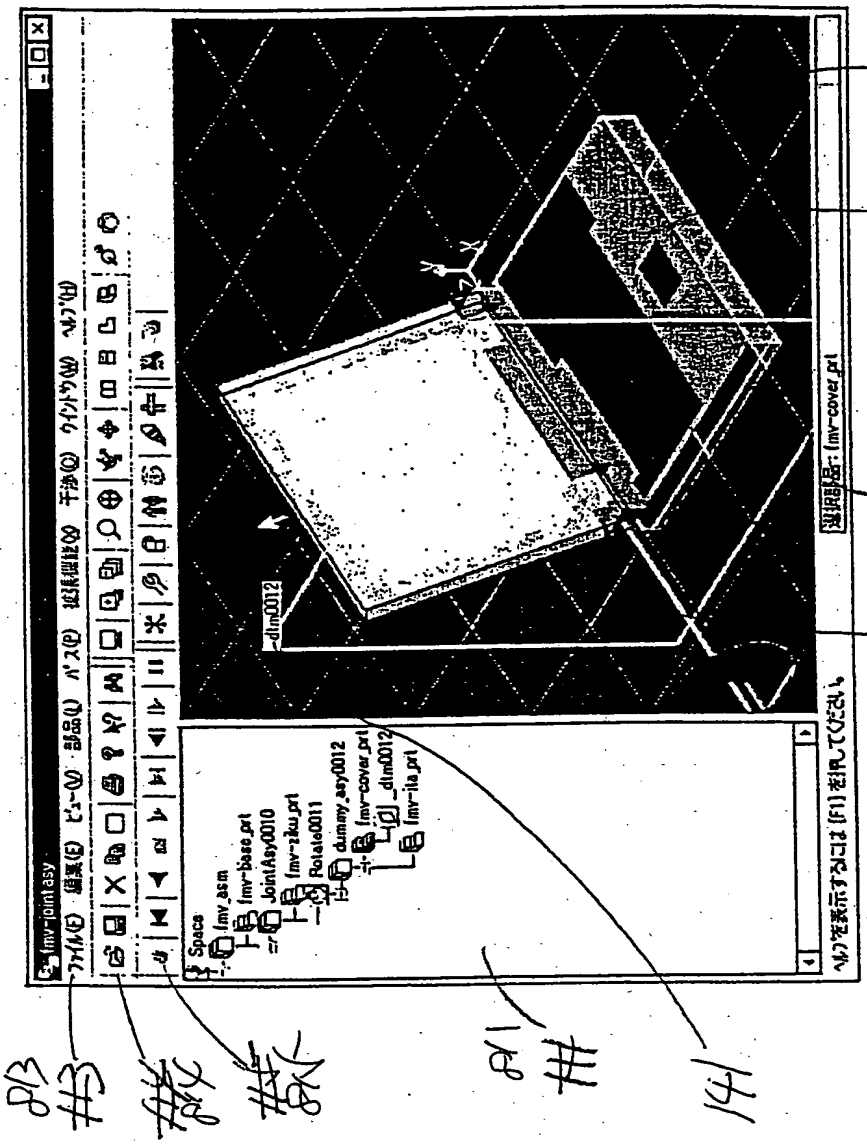
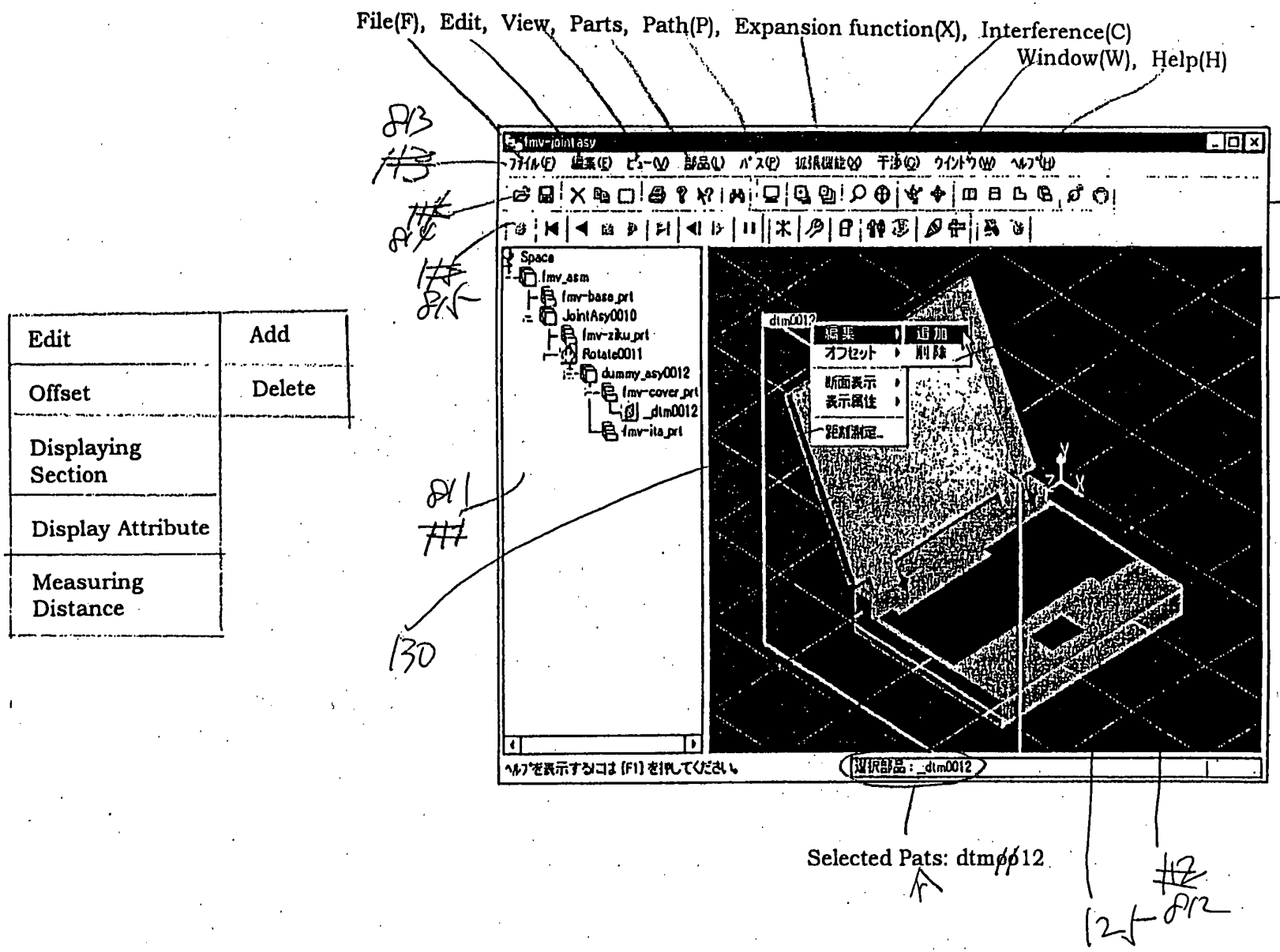


FIGURE 15

【図16】

ディスプレイ画面の説明図

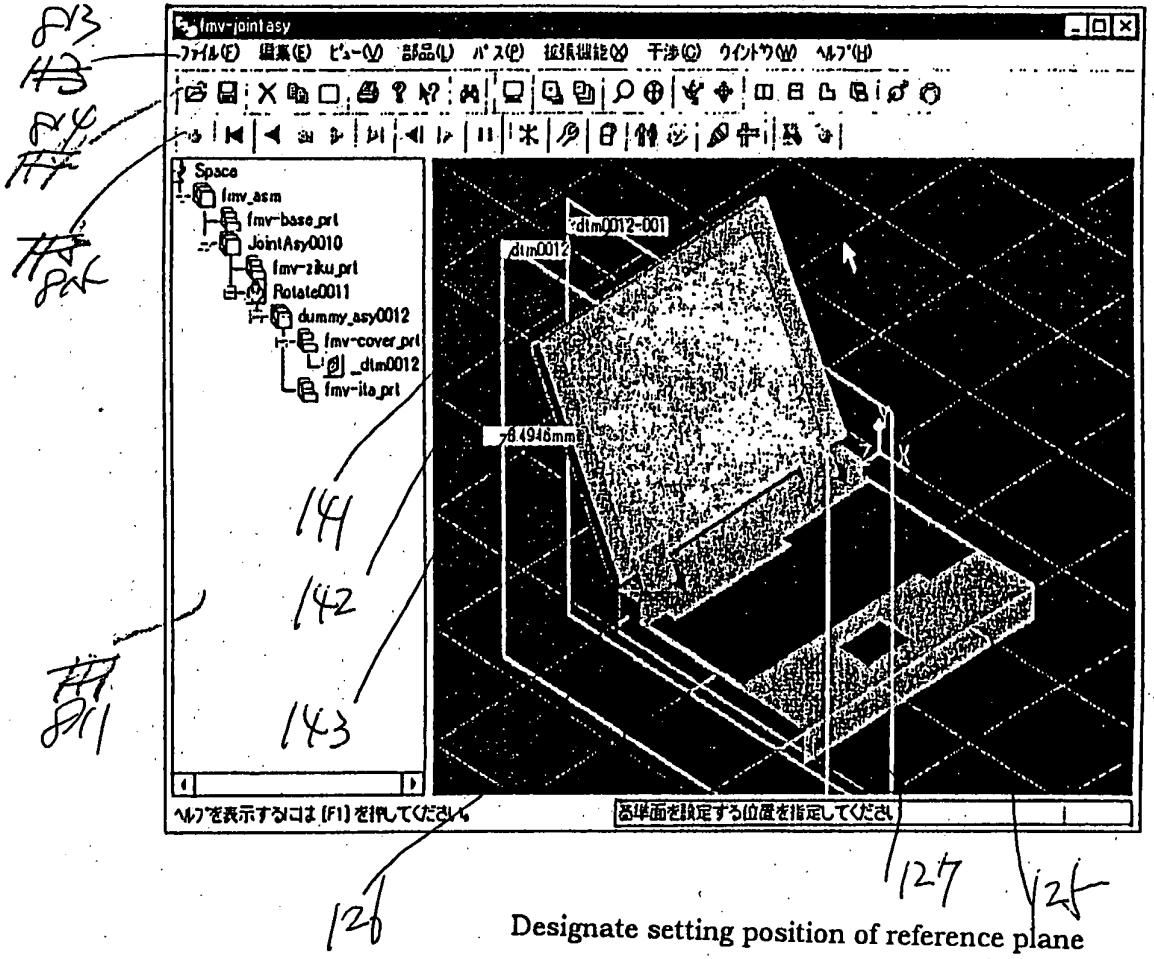


Edit	Add
Offset	Delete
Displaying Section	
Display Attribute	
Measuring Distance	

FIGURE 16

(47)

File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)



Designate setting position of reference plane

FIGURE 17

【図１８】

ディスプレイ画面の説明図

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File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)

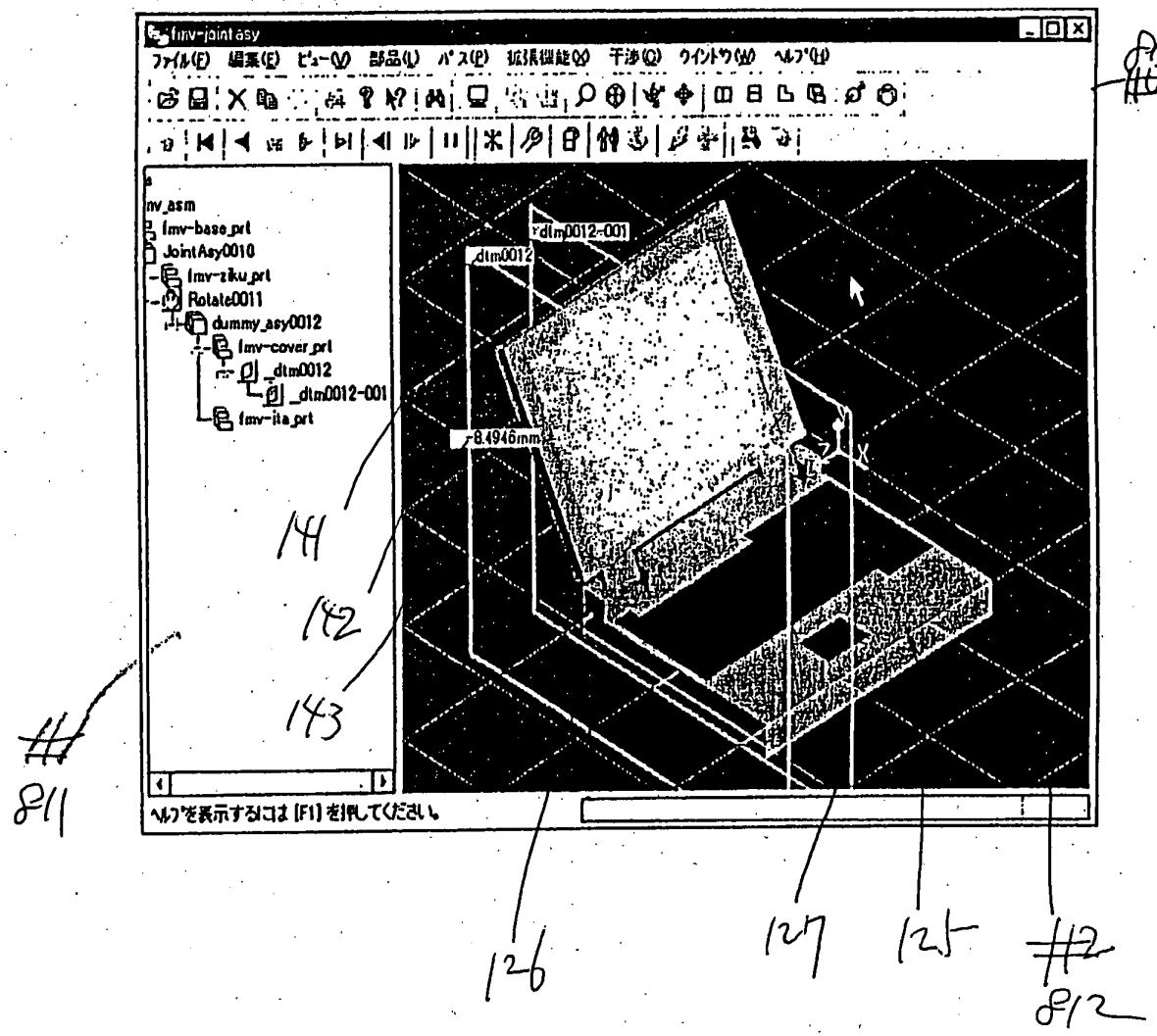


FIGURE 18

【図１９】

ディスプレイ画面の説明図

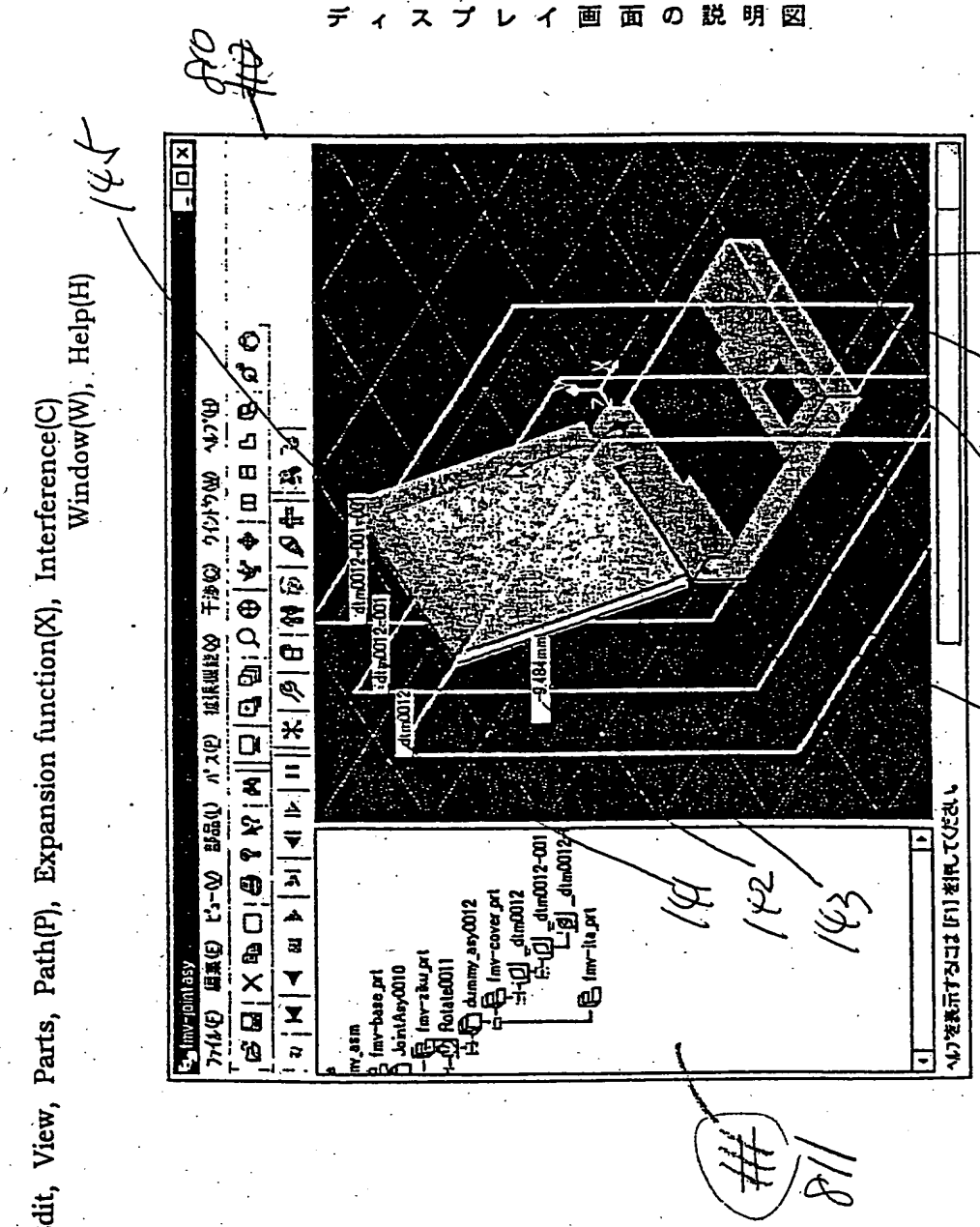


FIGURE 19

【図２０】

物体断面表示プログラムの処理説明図

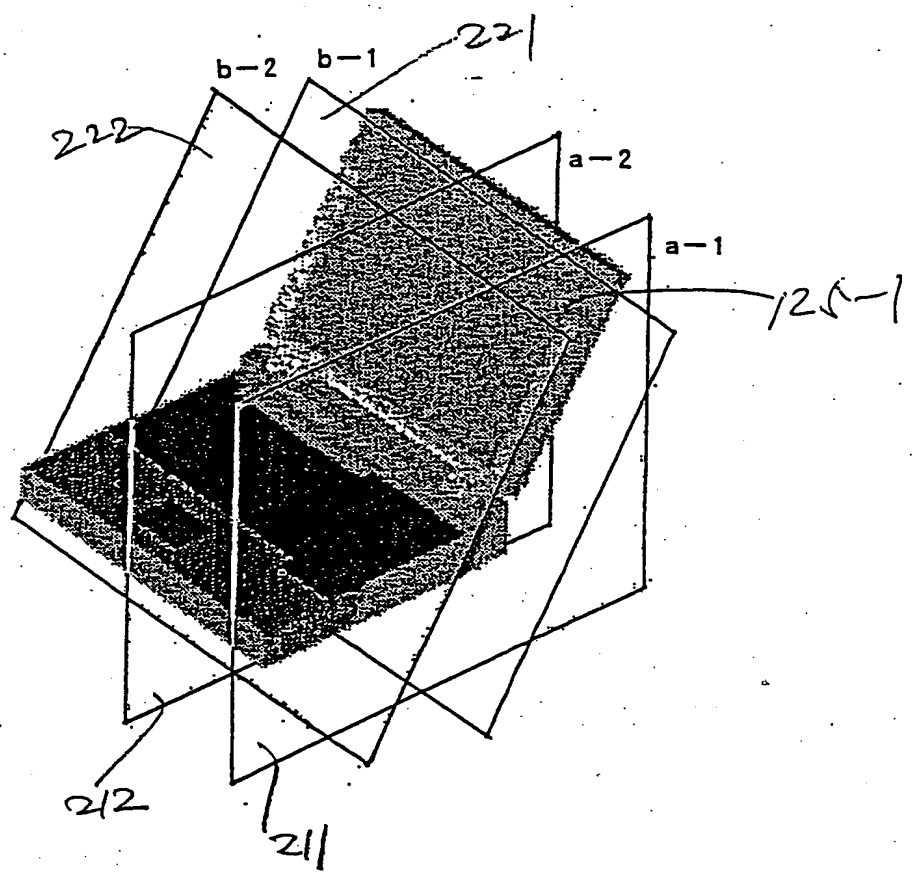


FIGURE 20

【図２１】

物体断面表示プログラムの処理説明図

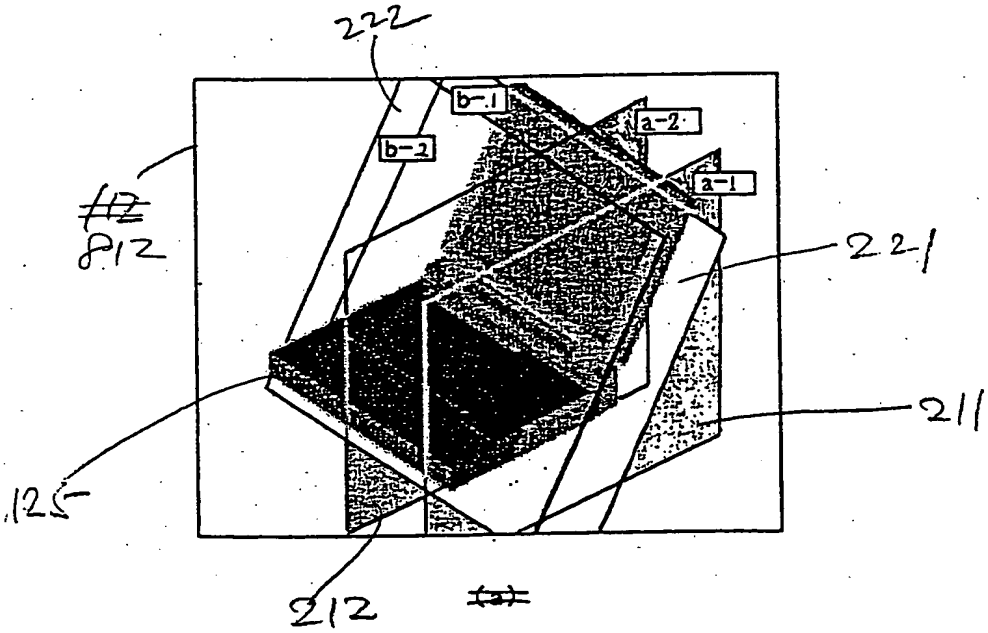


Fig 21A

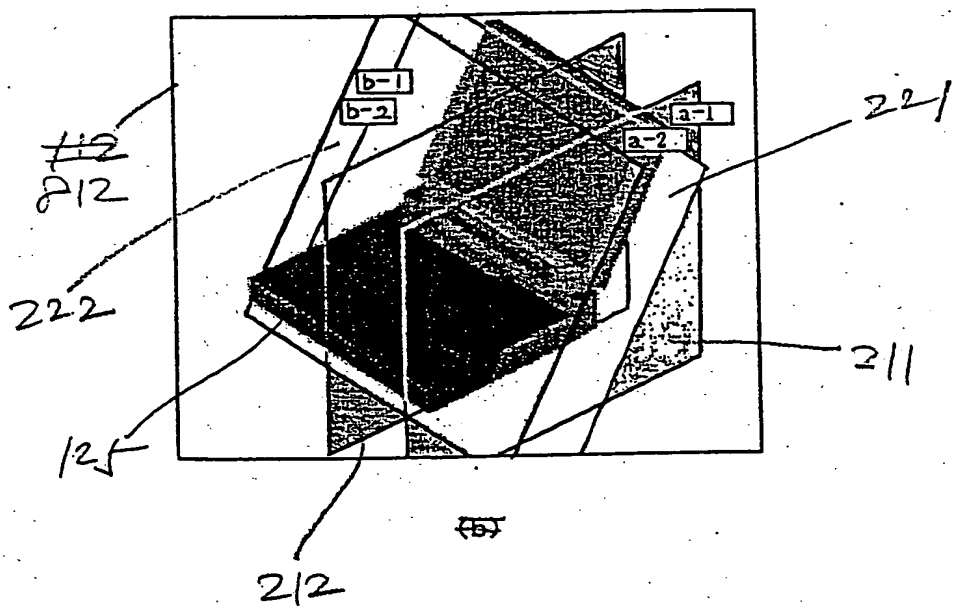


Fig 21B

【図２２】

物体断面表示プログラムの処理説明図

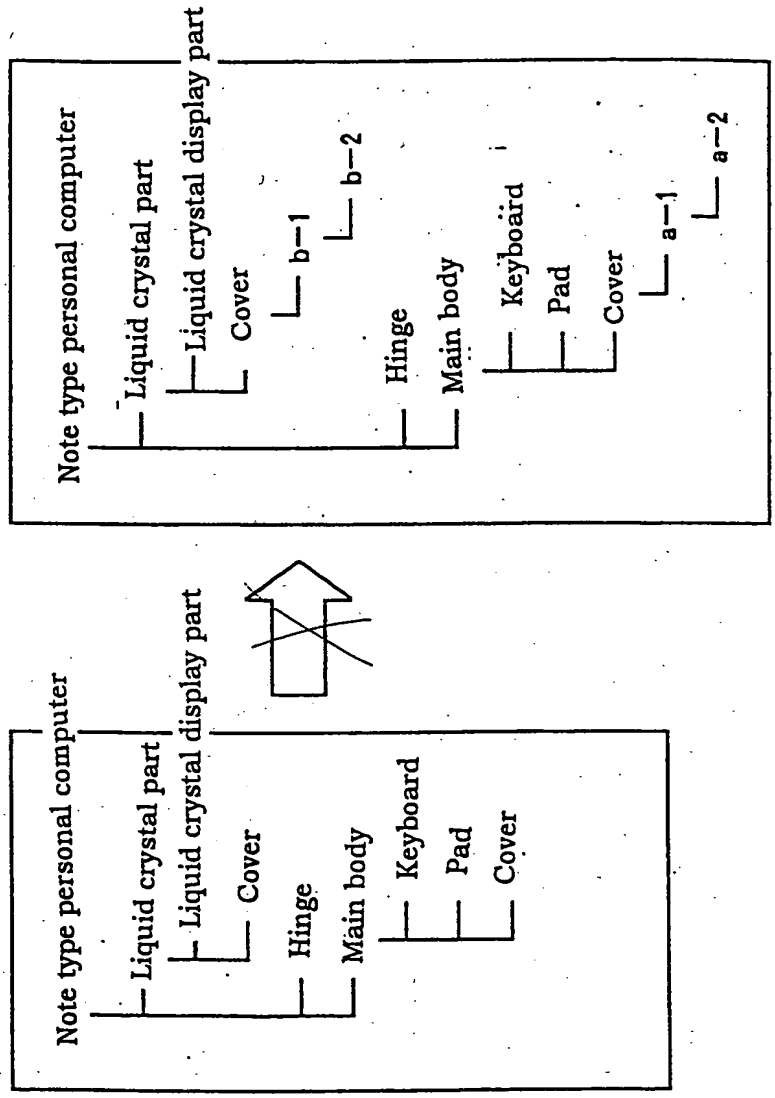


Fig. 22 B

Fig. 22 A

【図２３】

物体断面表示プログラムの処理説明図

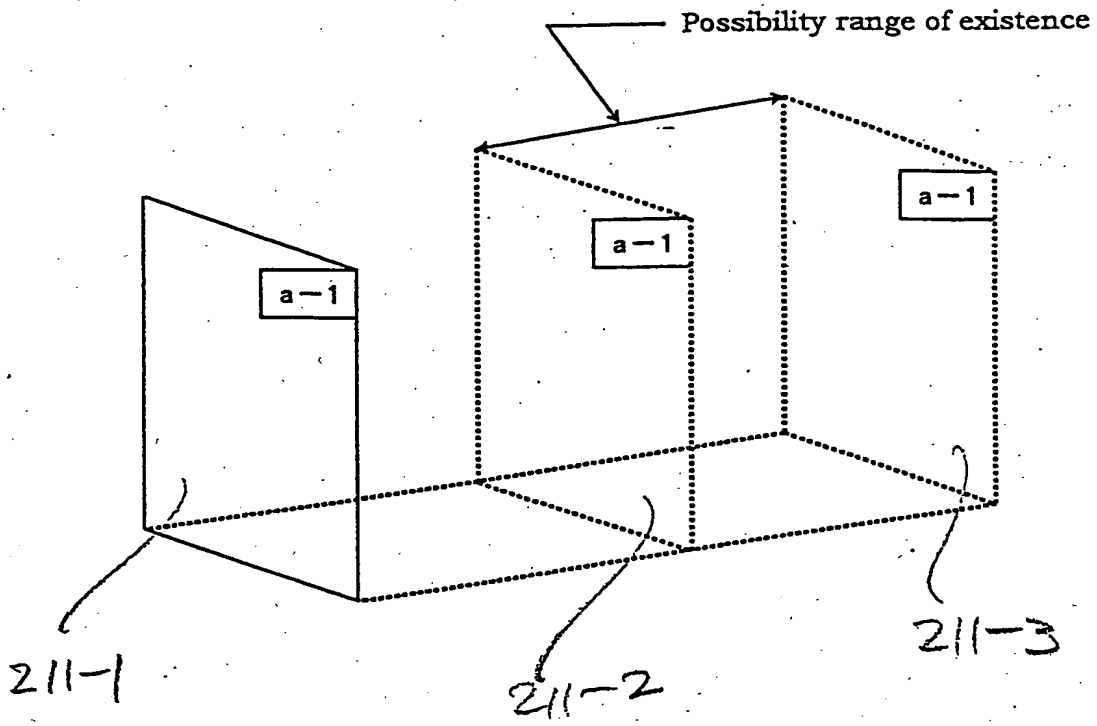
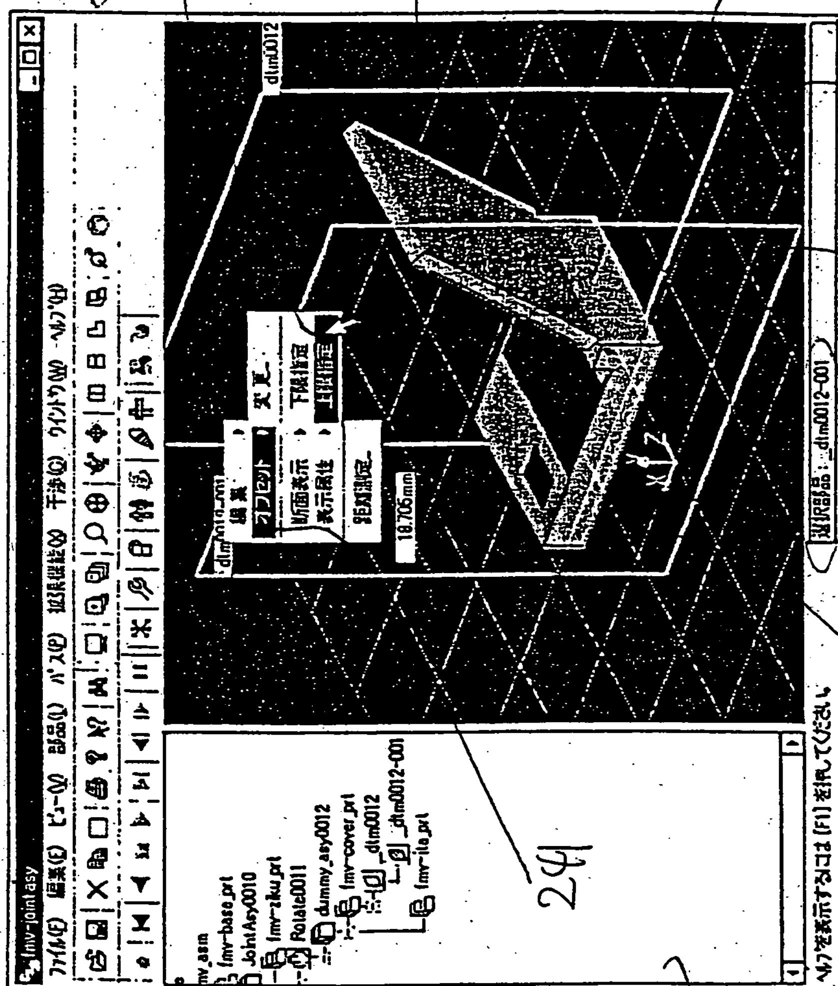


FIGURE 23

【図２４】

ディスプレイ画面の説明図



File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)

Edit	
Off set	Change
Displaying section	Designation of lower limit
Display attribute	Designation of upper limit
Measuring distance	

FIGURE 24

【図２５】

物体断面表示プログラムの処理説明図

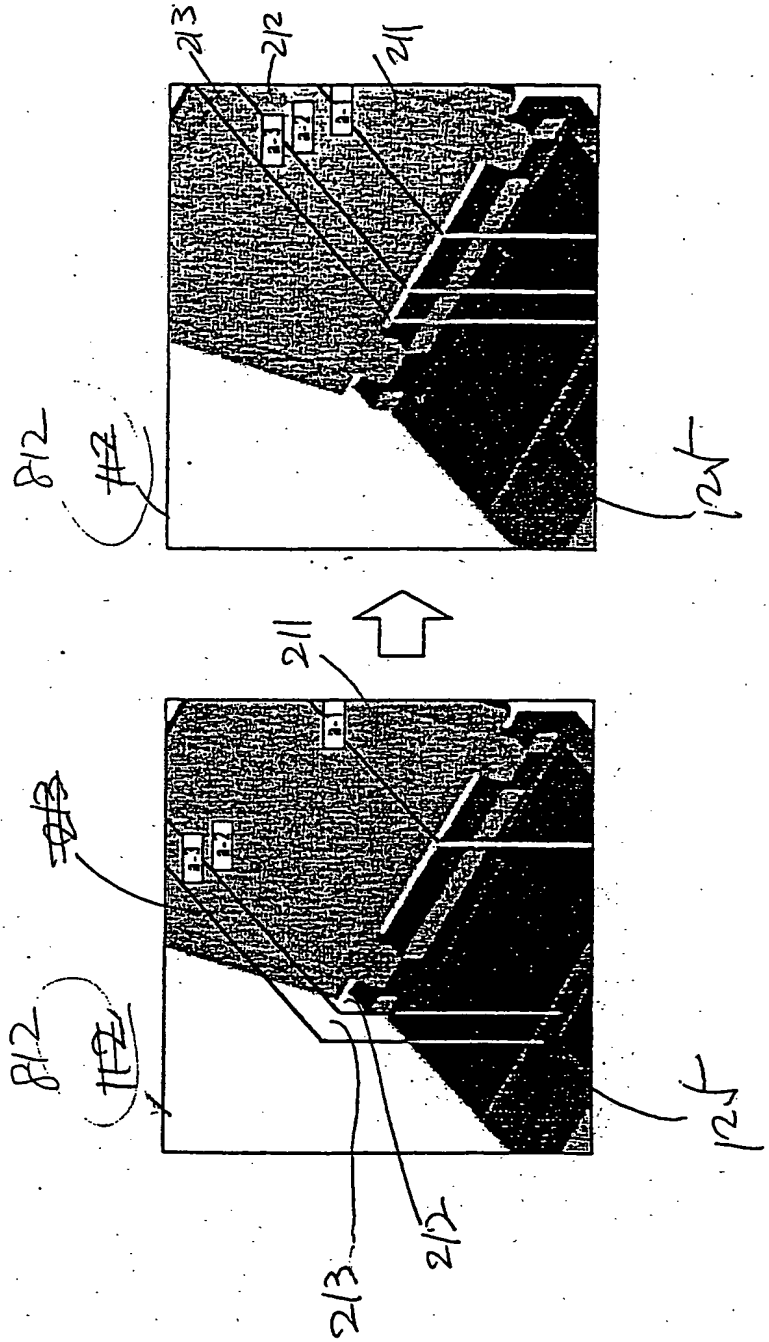


Fig. 24-B

Fig. 24-A

【図２６】

物体断面表示プログラムの処理説明図

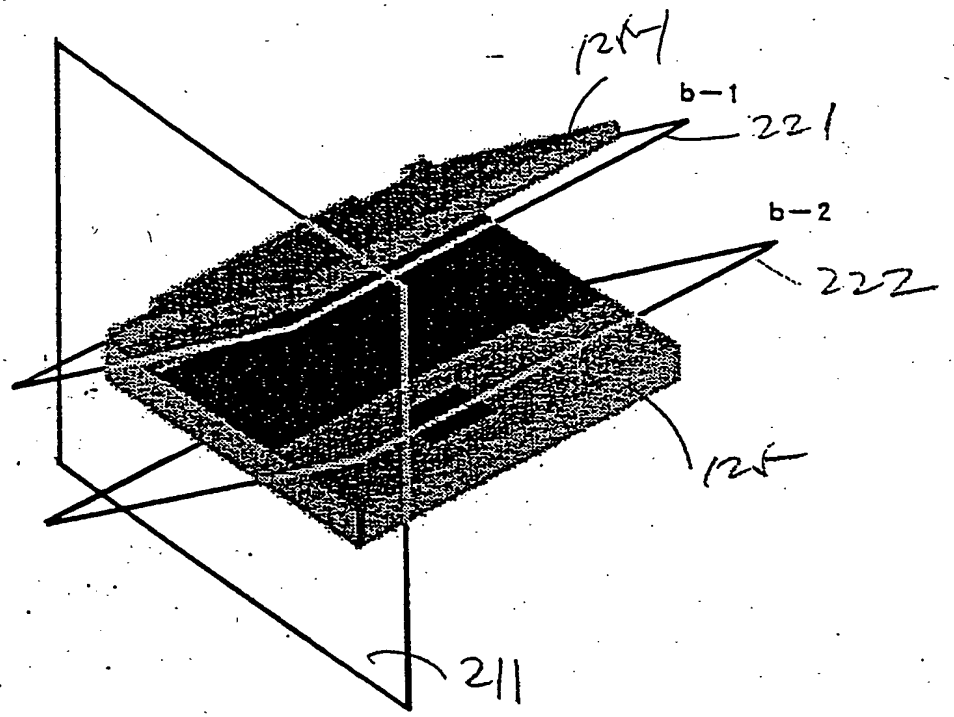


FIGURE 26

File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)

Edit	
Off set	
Displaying section	Validity
Attribute display	Inversion
Measuring distance	Section

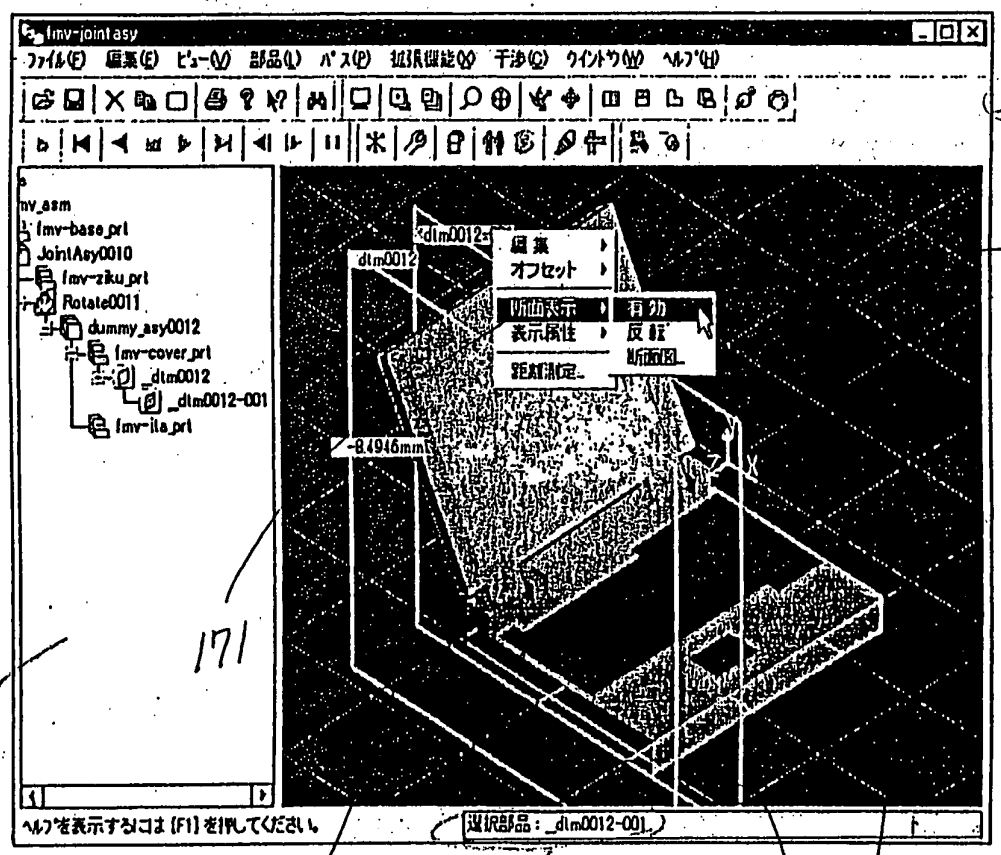


FIGURE 27

【図２７】

ディスプレイ画面の説明図

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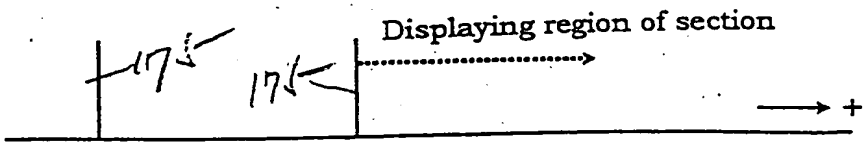
(58)

【図２８】

物体断面表示プログラムの処理説明図

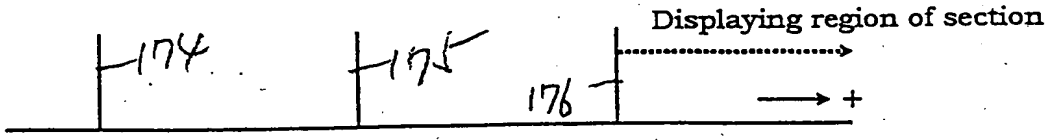
Fig.28A



Plane 1
Section generated direction
+

Plane 2
Section generated direction
+

Fig.28B

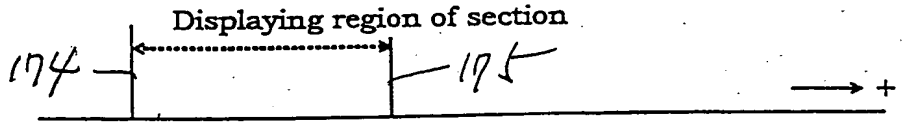


Plane 1
Section generated direction
+

Plane 2
Section generated direction
+

Plane 3
Section generated direction
+

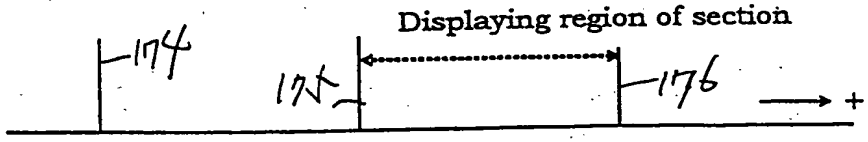
Fig.28C



Plane 1
Section generated direction
+

Plane 2
Section generated direction
-

Fig.28D



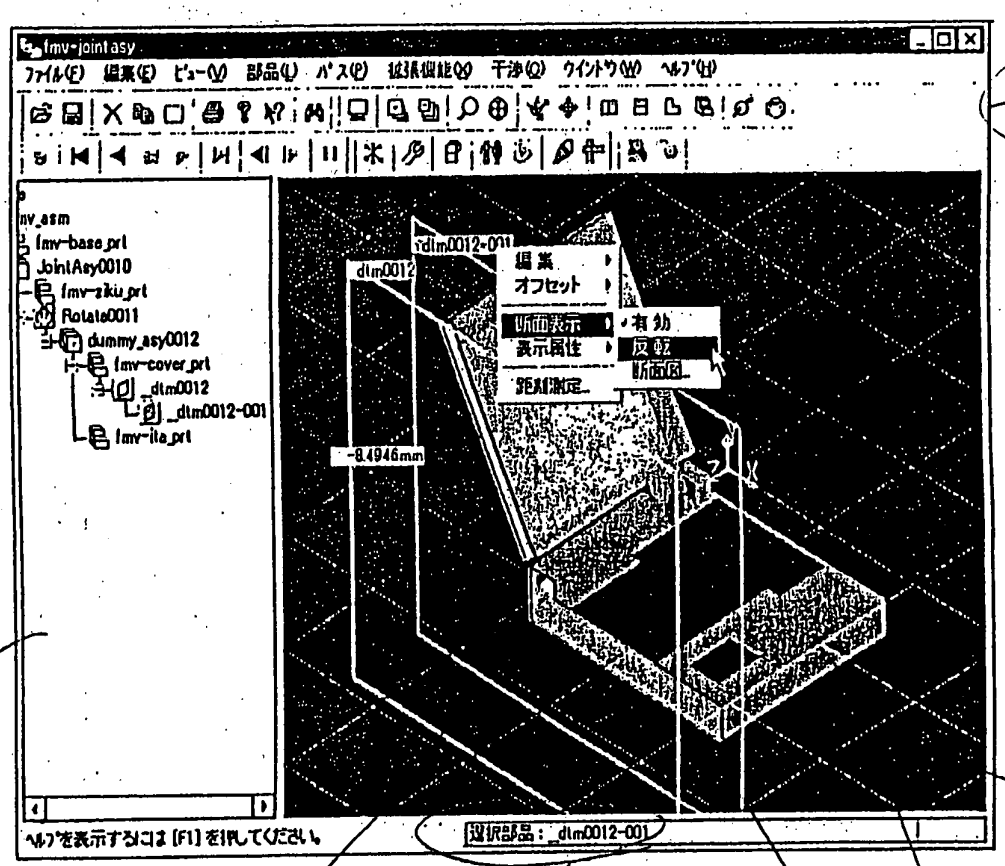
Plane 1
Section generated direction
+

Plane 2
Section generated direction
+

Plane 3
Section generated direction
-

File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)

Edit	
Off set	
Displaying section	Validity
Attribute display	Inversion
Measuring distance	Section



Selected parts: dtm0012-001

FIGURE 29

【図29】ディスプレイ画面の説明図

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(60)

【図３０】

ディスプレイ画面の説明図

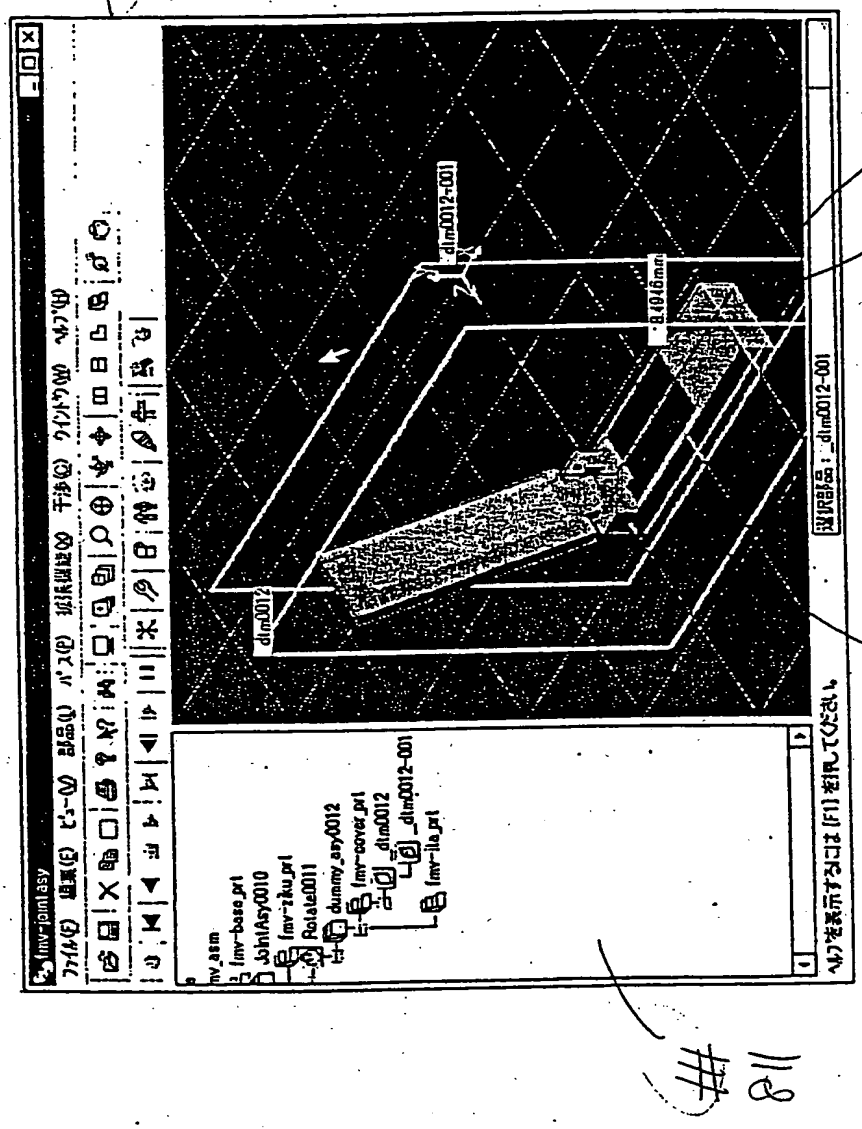


FIGURE 30

File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)

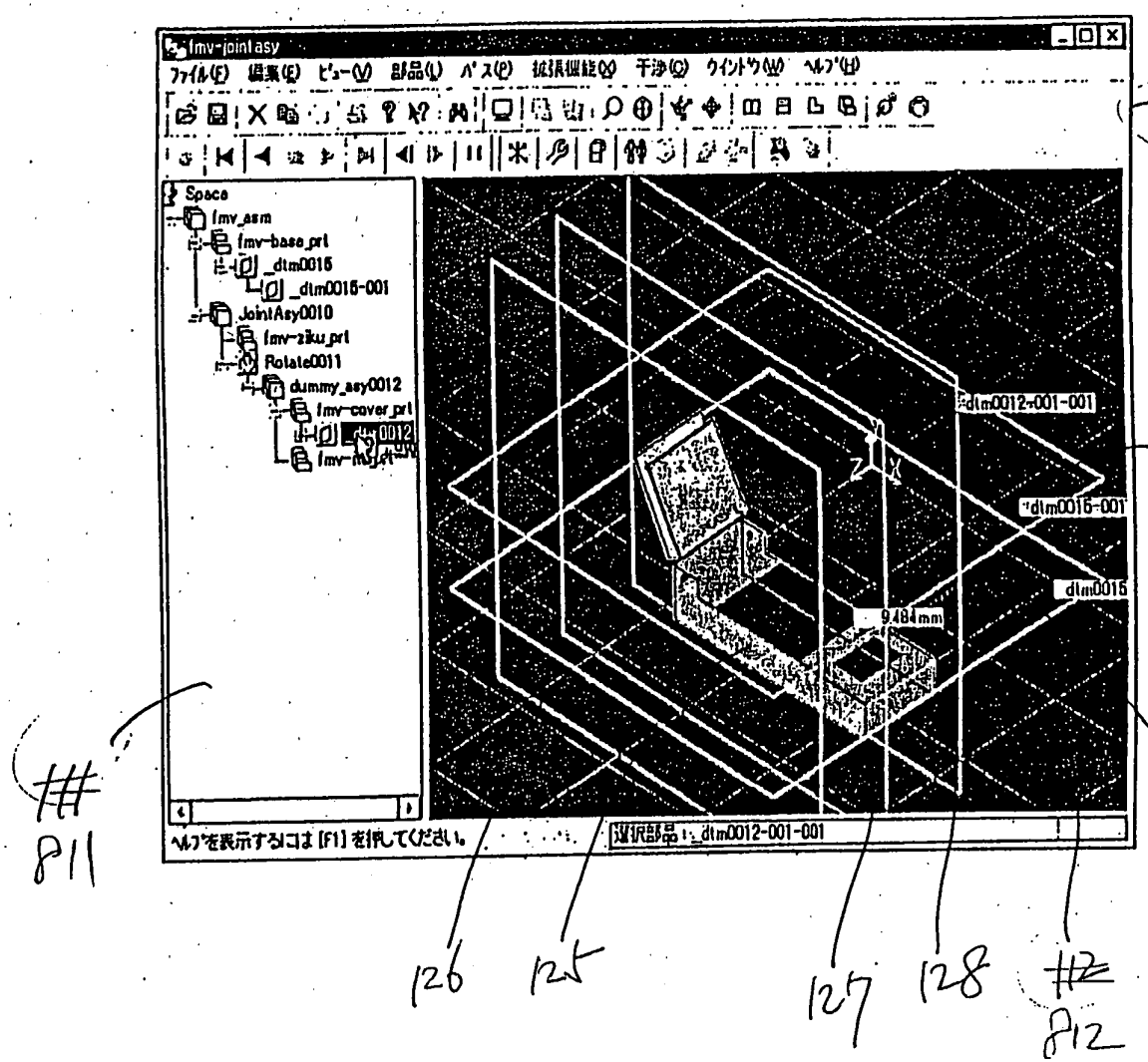


FIGURE 31

【図３１】

ディスプレイ画面の説明図

【図３２】

物体断面表示プログラムの処理説明図

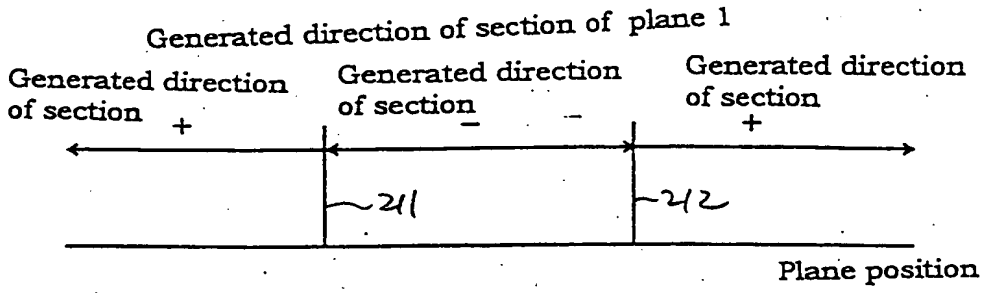


Figure 32A

Fig. 32A

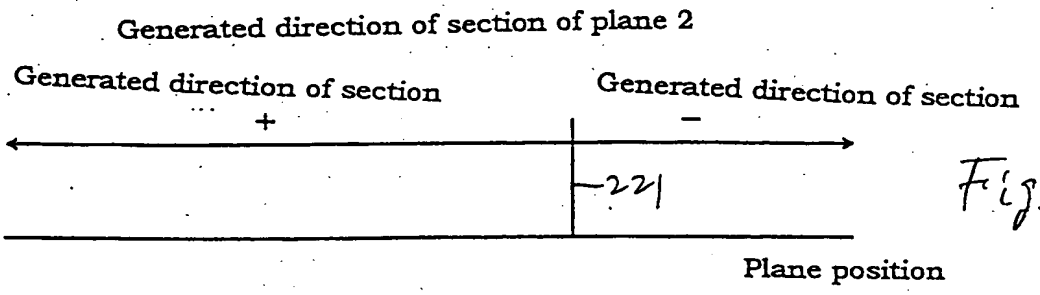


Figure 32 B

Fig. 32B

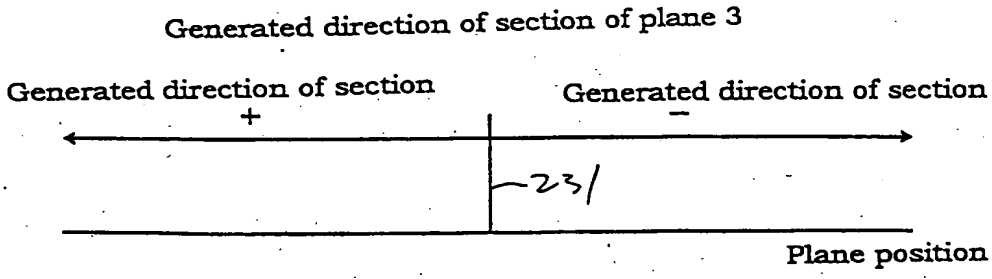


Figure 32 C

Fig. 32C

【図３３】

ディスプレイ画面の説明図

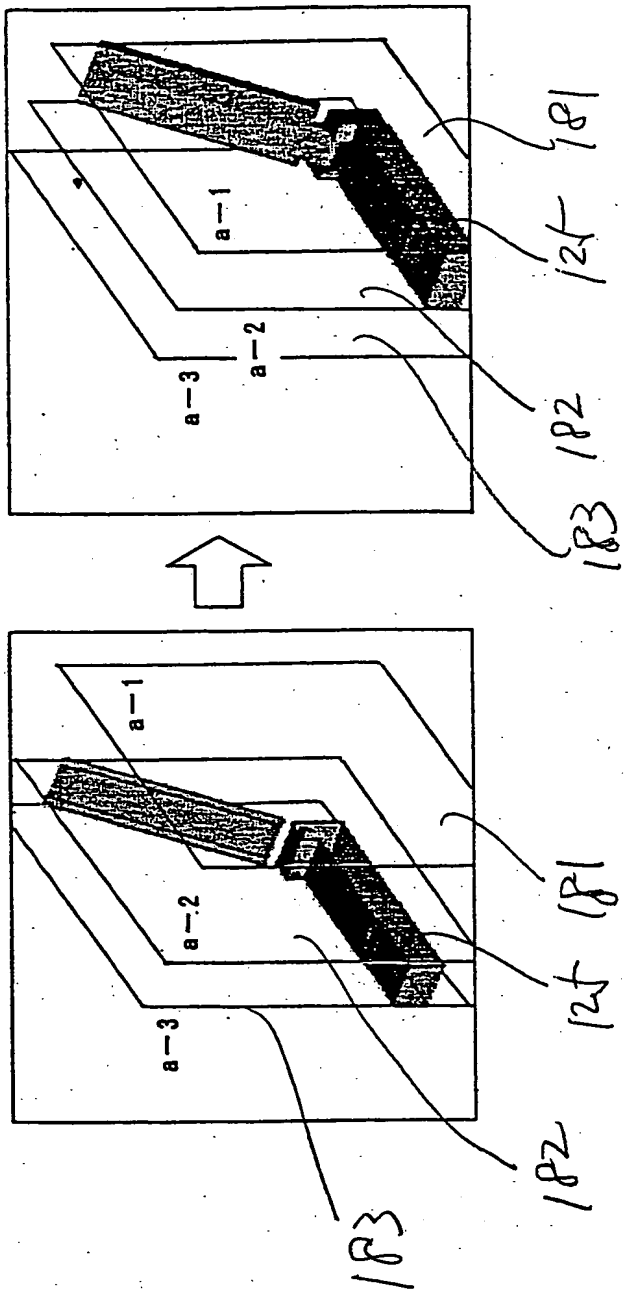


Fig. 33B

Fig. 33A

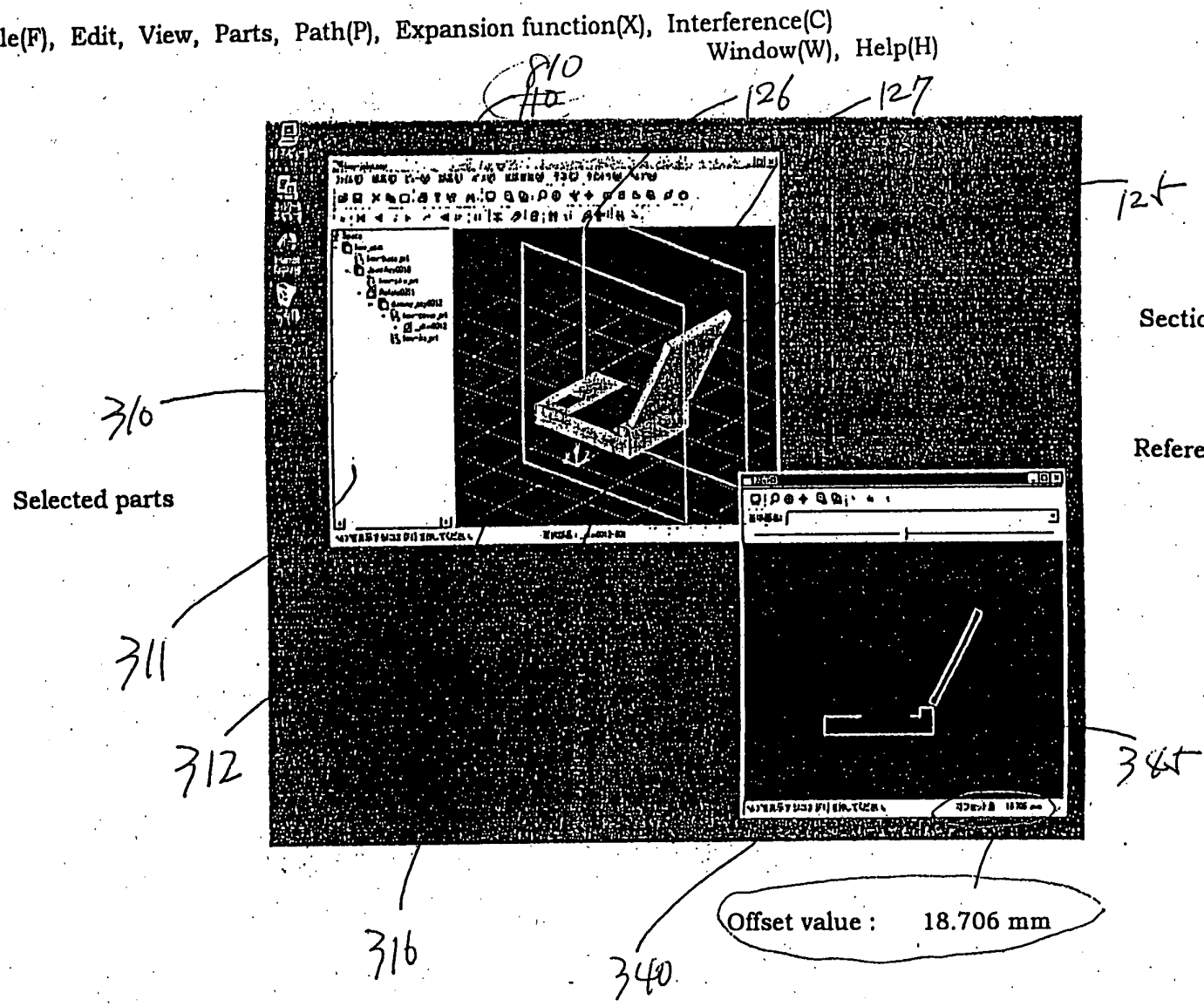

File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)
310
126
127
124
Section
Reference plane
Selected parts
311
312
314
316
340
Offset value : 18.706 mm

FIGURE 34

【図３５】

ディスプレイ画面の説明図

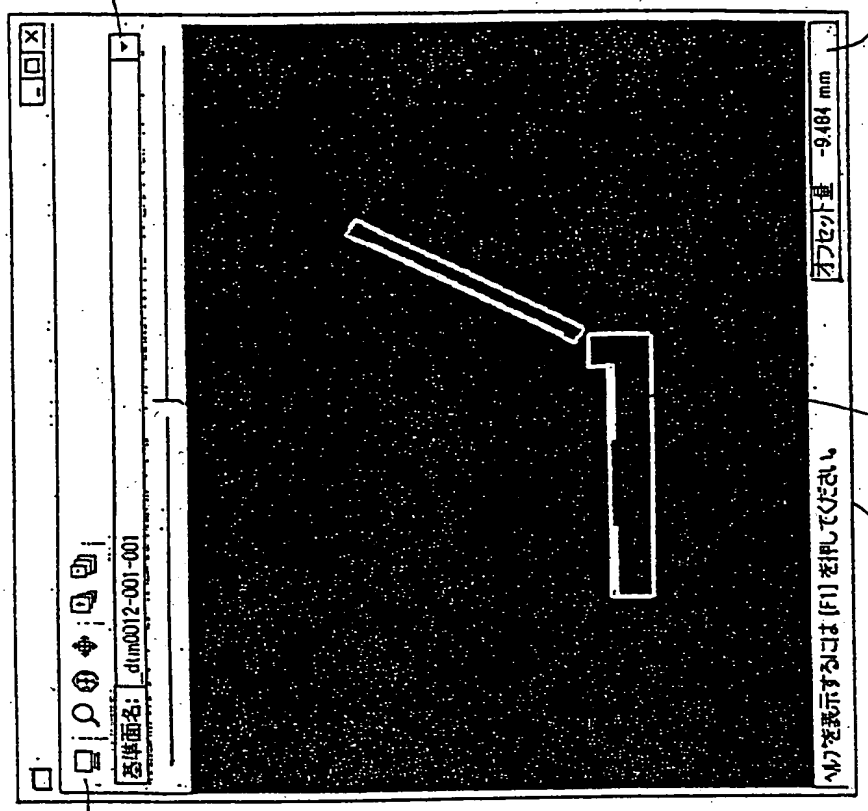


FIGURE 35

【図３６】

物体断面表示プログラムの処理説明図

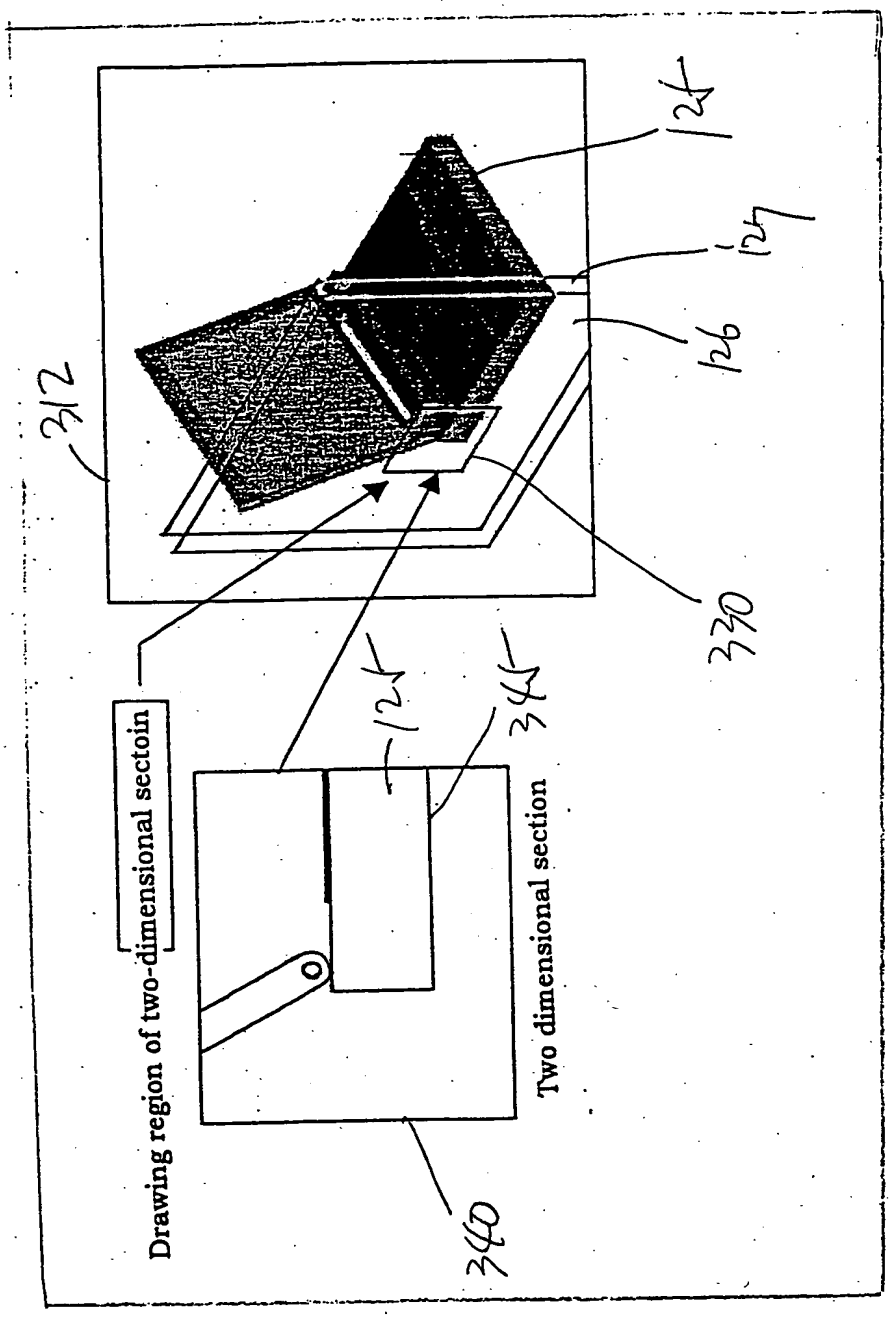


FIGURE 36

【図３７】

Image showing potential
match of looking at point
312
124
327
326
330-1
Figure 37 (A)
Drawing region after
changing looking at point
注視点変更後の描画領域
124
Mouse cursor showing
potential match of looking at point
340-1
340
330-2
Figure 37 (B)

【図３８】

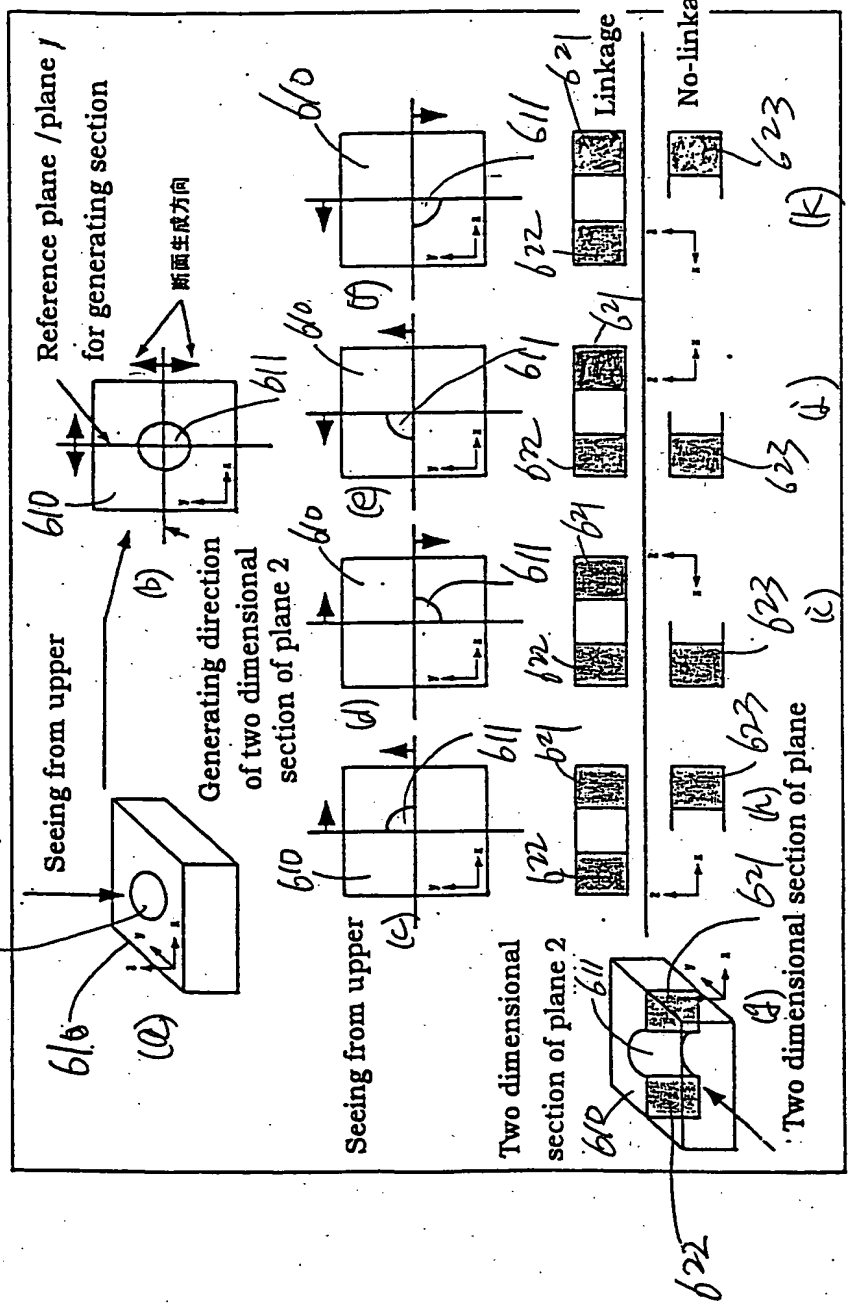


Figure 38

【図３９】

物体断面表示プログラムの処理説明図

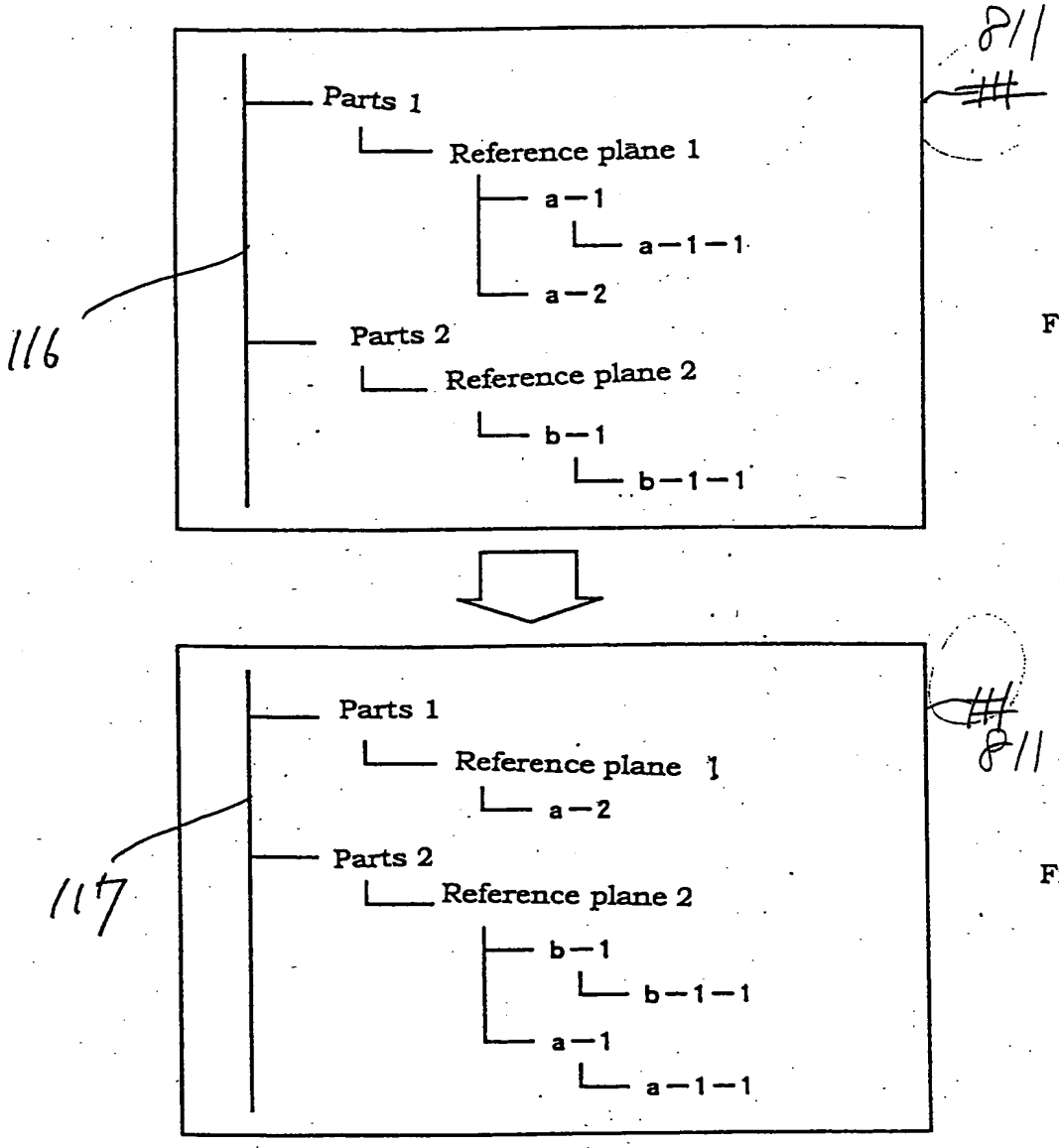


Figure 39 A

Figure 39 B

【図４０】

物体断面表示プログラムの処理説明図

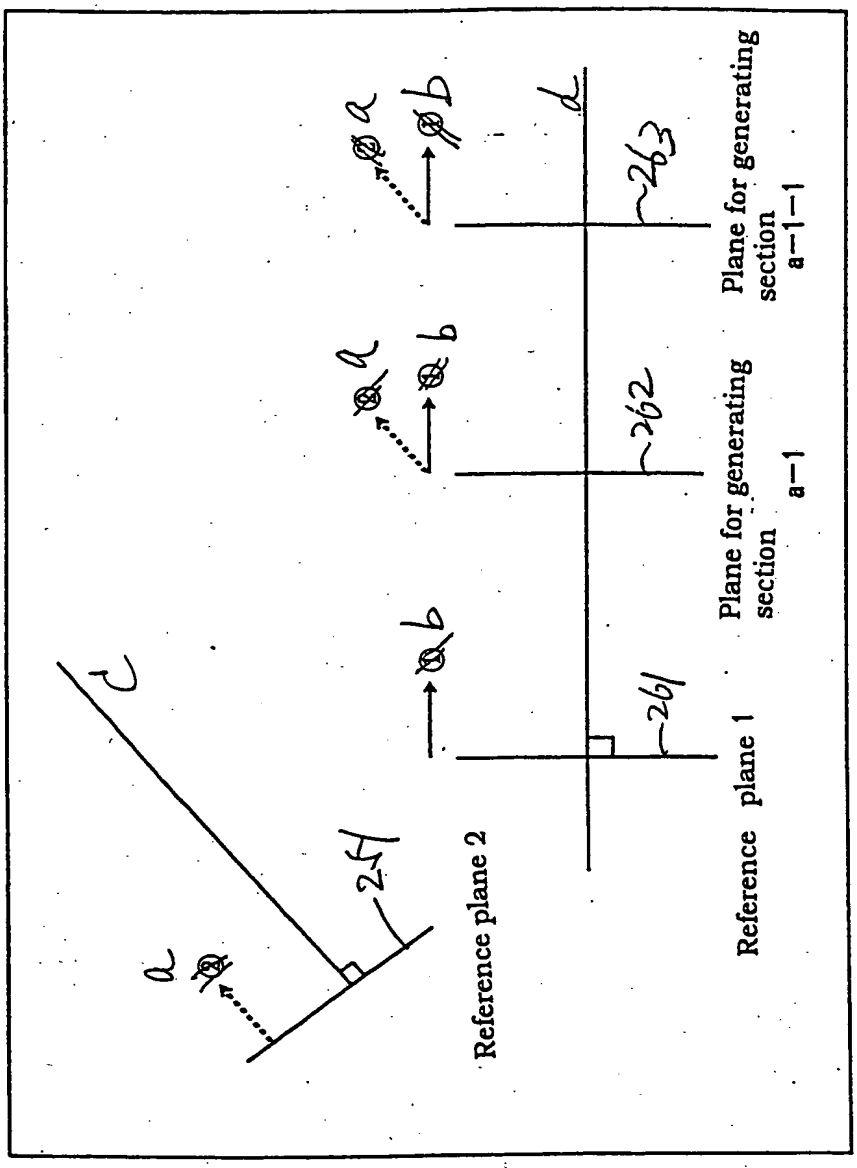


FIGURE 40

【図４１】

物体断面表示プログラムの処理説明図

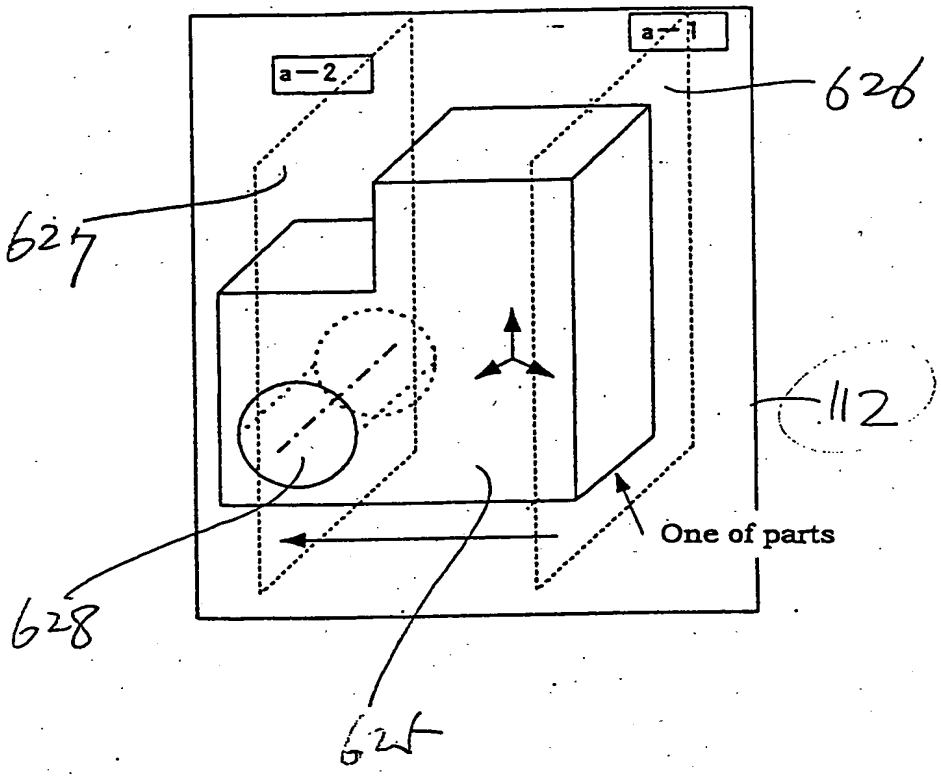


FIGURE 41

【図４２】

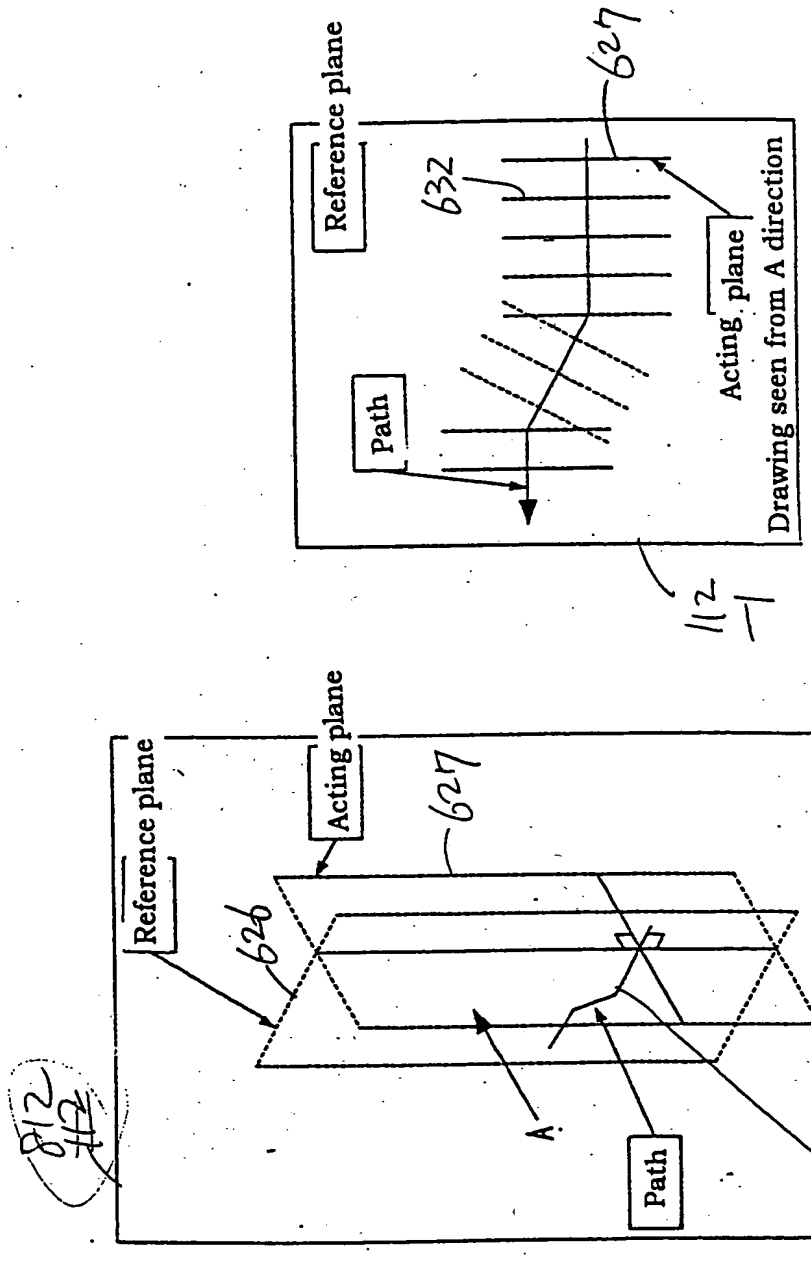


Figure 42B

Figure 42A

【図４３】

物体断面表示プログラムの処理説明図

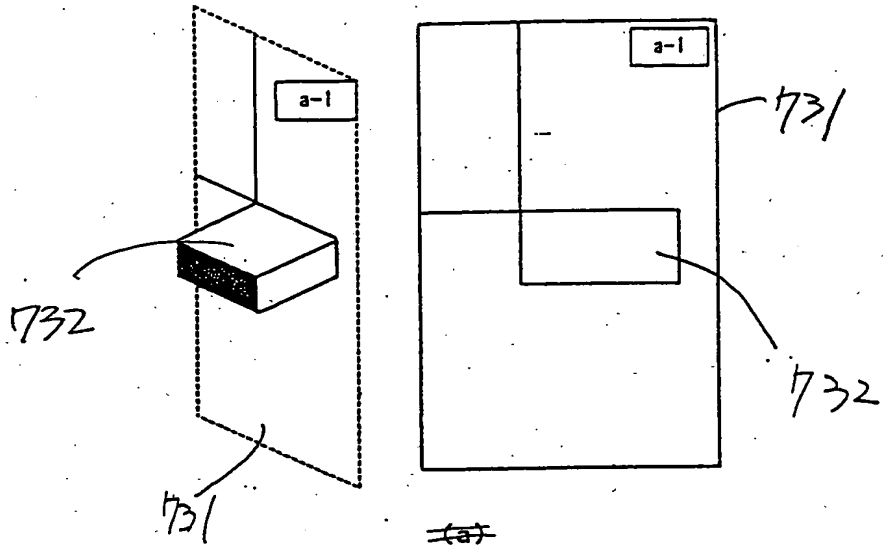


Fig. 43A

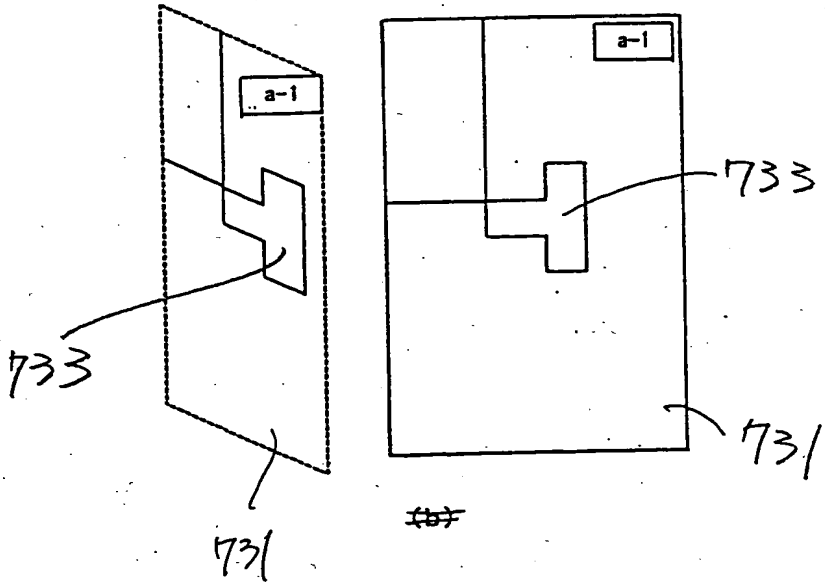


Fig. 43B

【図４４】

物体断面表示プログラムの処理説明図

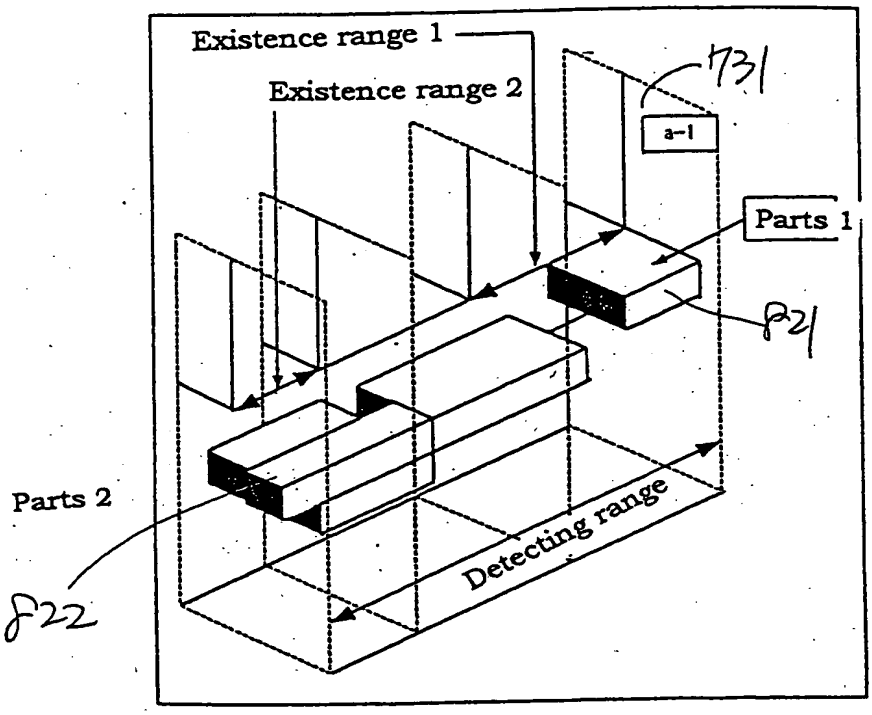


FIGURE 44

【図４５】

本発明の機能ブロック図

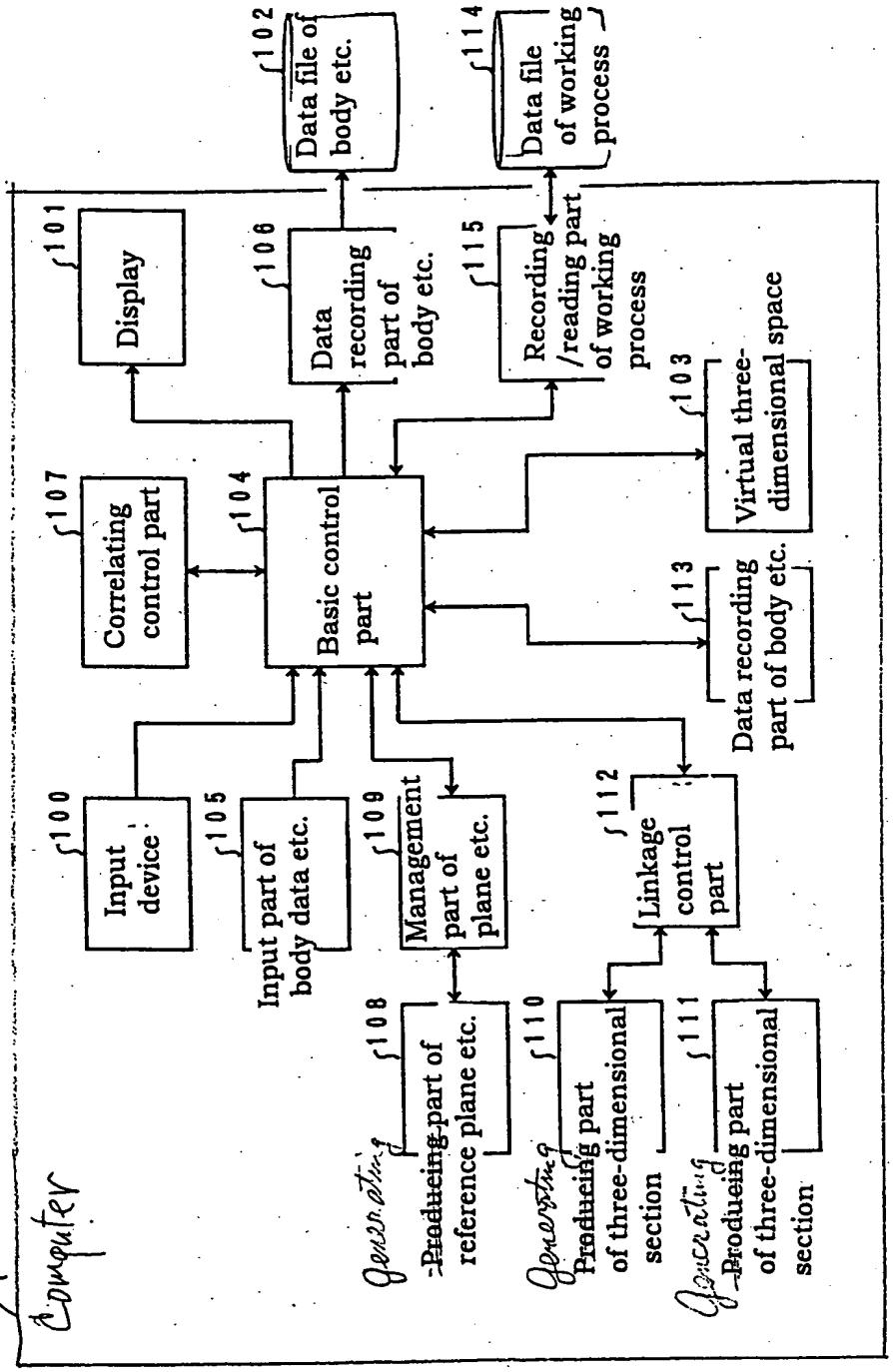
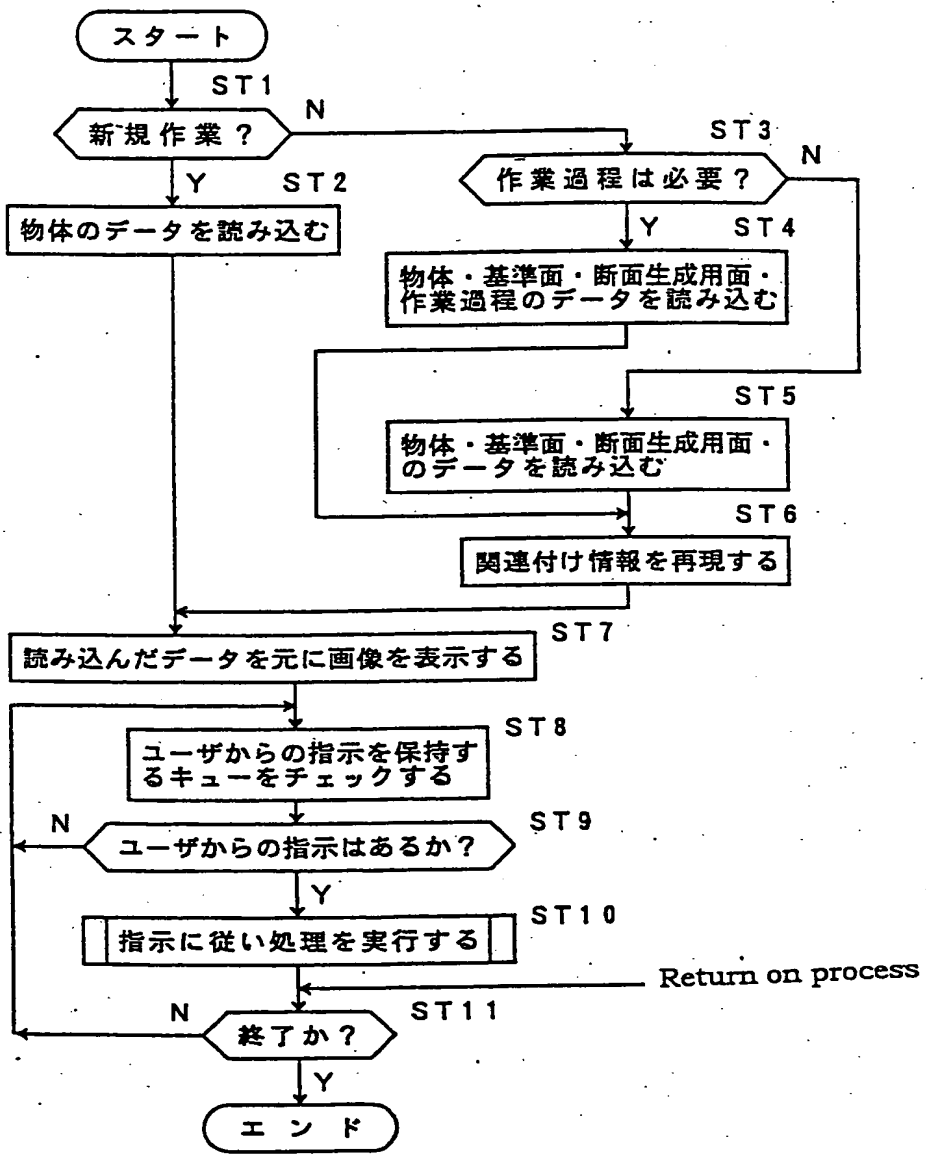


Figure 45

Figure 46

本発明の実行する処理フロー

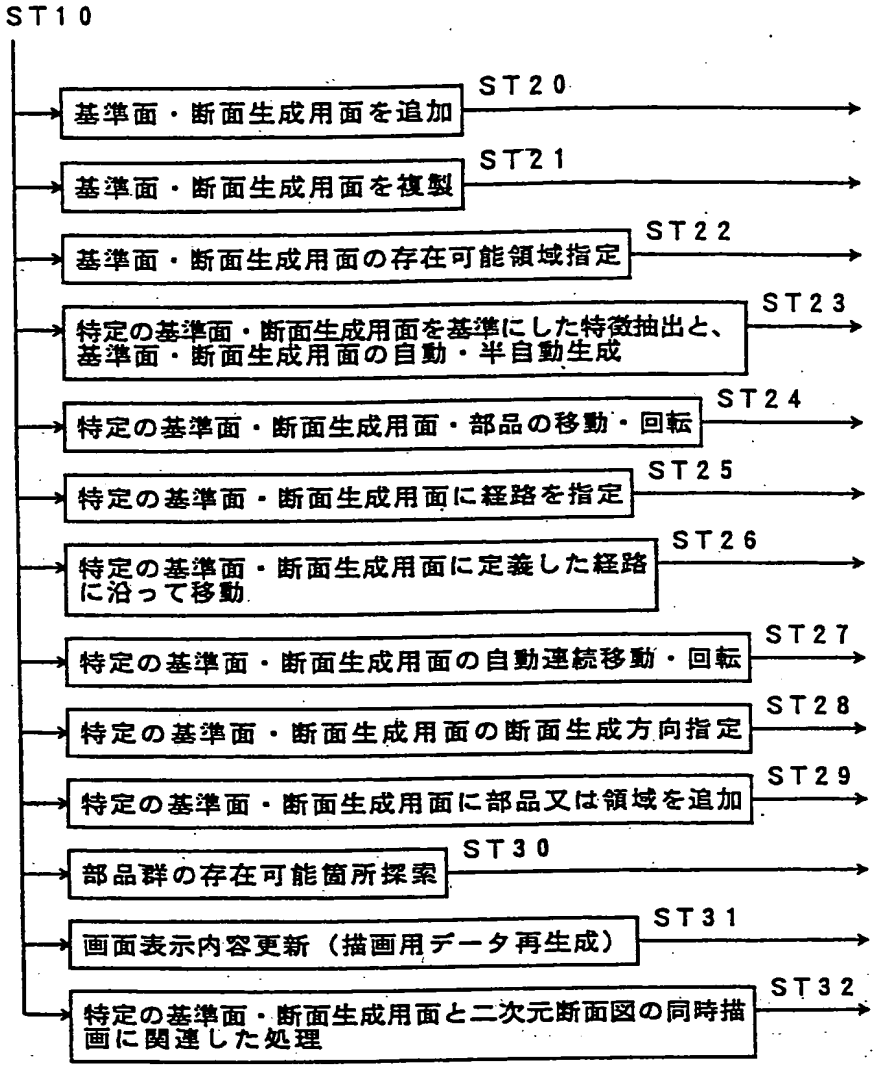


ST1 New work ?
ST2 Read data of body
ST3 Is necessary work history
ST4 Read data of body, reference plane, plane for generating cross section and work history
ST5 Read data of body, reference plane, plane for generating cross section
ST6 Reproduce relation information
ST7 Display image based on the read data
ST8 Check queue keeping directions from a user
ST9 Is there direction of a user
ST10 Implement execute process according to direction
ST11 End of process ?

Figure 47

整理番号:99-50103

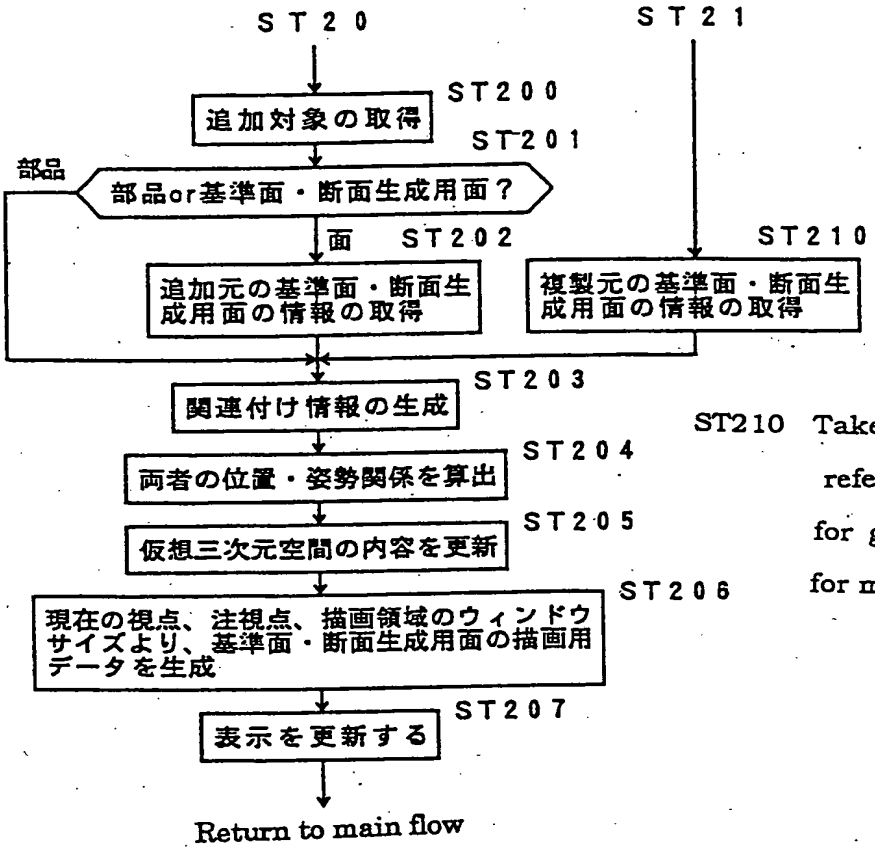
本発明の実行する処理フロー



ST20 Addition of reference plane/ plane for generating cross section
ST21 Copy of reference plane/ plane for generating cross section
ST22 Direction of allowable region of reference plane /plane for generating cross section
ST23 Extraction based on specified reference plane /plane for generating cross section, and automatic / semiautomatic generation of reference plane / plane for generating cross section
ST24 Transfer / rotation of specified reference, plane for generating cross section and parts
ST25 Direction of path on specified reference plane / plane for generating cross section
ST26 Move along the route along the path reference plane / plane for generating Cross section
ST27 Automatic succeeding transfer and rotation of specified reference plane / plane for generating cross section
ST28 Request of direction of plane for generating cross section for specified reference plane / plane for generating cross section
ST29 Addition of parts and region in the specified reference plane / plane for generating cross section
ST30 Allowable region of parts existing Detection of allowable region of parts exiting
ST31 Update of display (regeneration of image data
ST32 Process concerning to image simultaneously specified reference plane / plane for generating cross section and two dimensional cross section

Figure 48

本発明の実行する処理フロー



ST210 Take information of original reference plane / plane for generating section for making copy

ST200 Take the addition object

ST201 Parts or reference plane / plane for generating cross section ?

ST202 Take information of original reference plane / plane for generating cross section for addition

ST203 Create information on relation

ST204 Calculate position / pose relation thereof

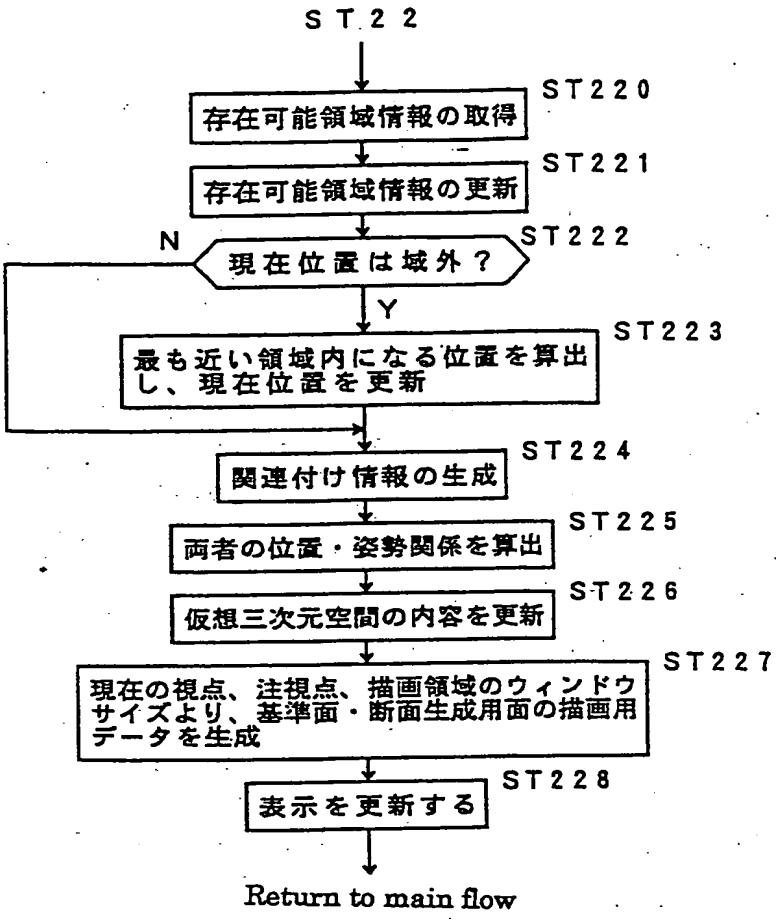
ST205 Update contents of virtual three dimensional cross section

ST206 Generate image data of reference plane / plane for generating cross section by present viewpoint, observing point and window size of image region

ST207 Update dispau

Figure 49

本発明の実行する処理フロー



ST220 Take information of allowable region of existence

ST221 Update information of allowable region of existence

ST222 Present position is out of the region ?

ST223 Calculate the nearest position in the region, and update present position

ST224 Generate information of relation

ST225 Calculate position / pose relation thereof

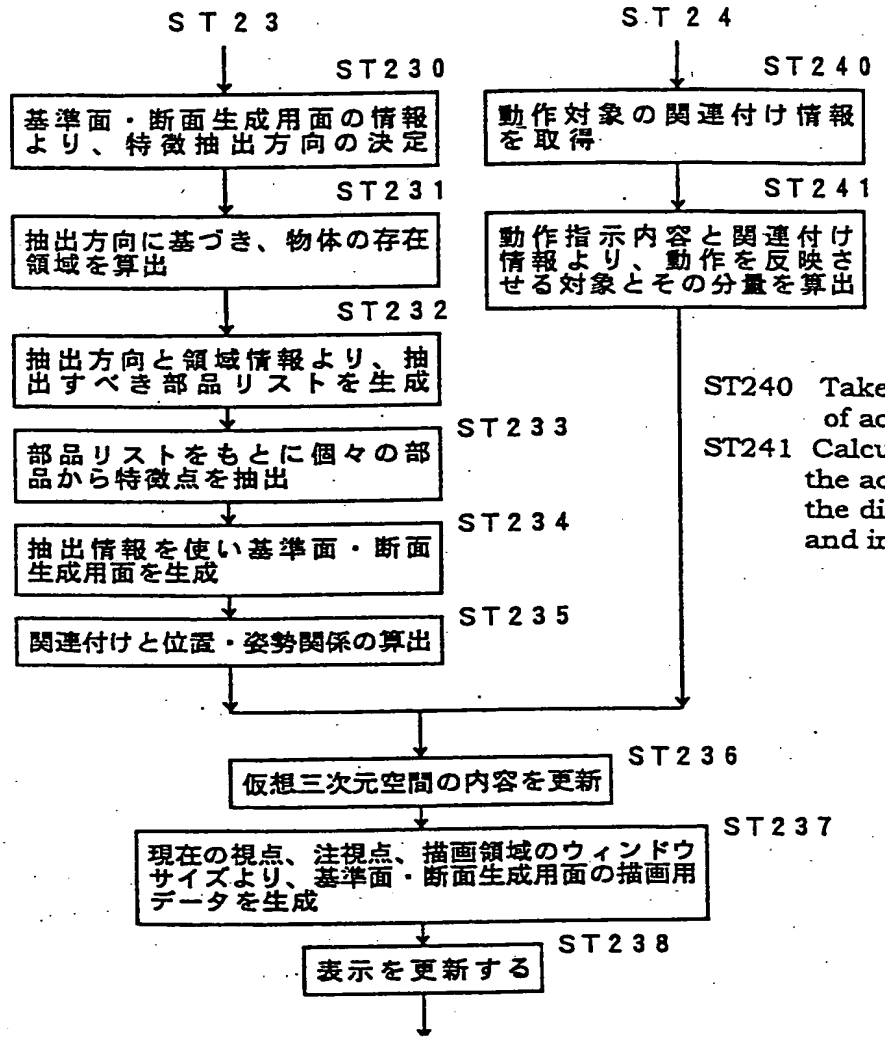
ST226 Update virtual three dimensional cross section

ST227 Generate image data of reference plane / plane for generating cross section by present viewpoint, observing point and window size of image region

ST228 Update display

Figure 50

本発明の実行する処理フロー



ST240 Take information of relation of action object

ST241 Calculate object reflecting the action and the value from the direction of action and information of relation

ST230 Determine of specified extraction from information of reference plane / plane for generating cross section

ST231 Calculate allowance region of body existing based on the extracted direction

ST232 Generate parts list for extracting from extracting direction and information of region

ST232 Extract specified point from each of parts based on parts list

ST234 Generate reference plane / plane for generating cross section

ST235 Calculate relation and position / pose relation

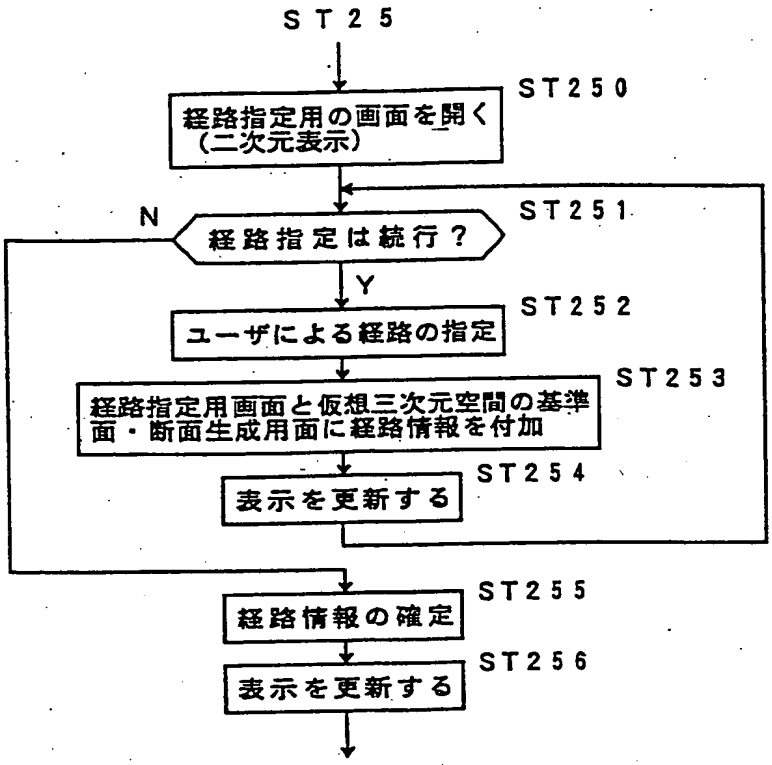
ST236 Update virtual three dimensional cross section

ST237 Generate image data of reference plane / plane for generating cross section by present viewpoint, observing point and window size of image region

ST238 Update display

Figure 51

本発明の実行する処理フロー



ST250 Open screen for directing path (two dimensional diplay)

ST251 Continue direction of path

ST252 Direction of path by a user

ST53 Add path information to screen for directing path, reference plane / plane for generating cross section in virtual three dimensional space

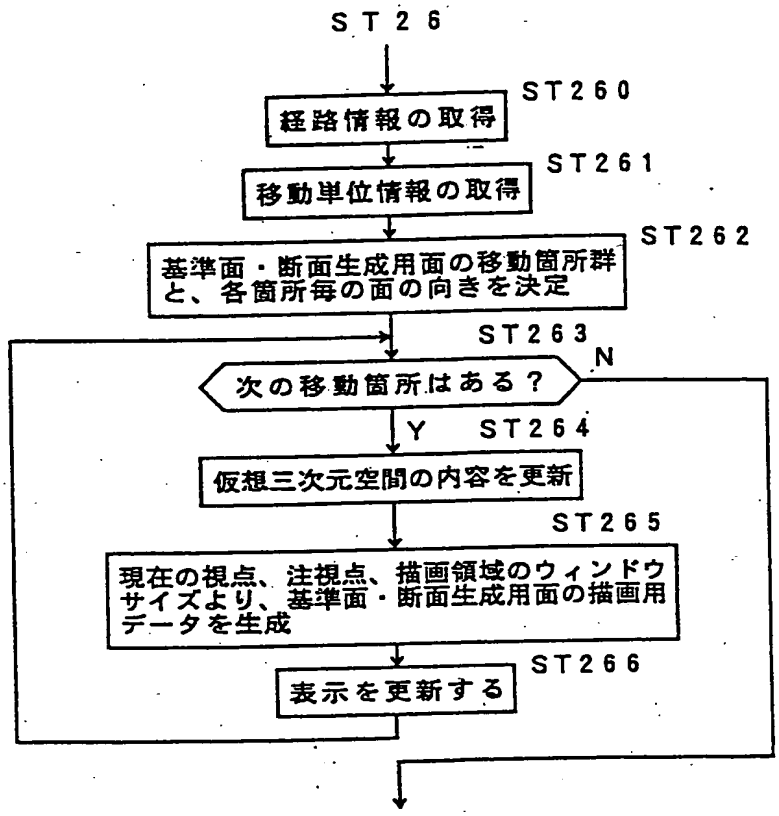
ST254 Update display

ST255 Determine path information

ST256 Update display

Figure 52

本発明の実行する処理フロー



ST260 Take path information

ST261 Take information of moving unit.

ST262 Determine moved points group of reference plane and plane foe generating cross section, and direction of the plane at each position

ST263 Is there next moving place ?

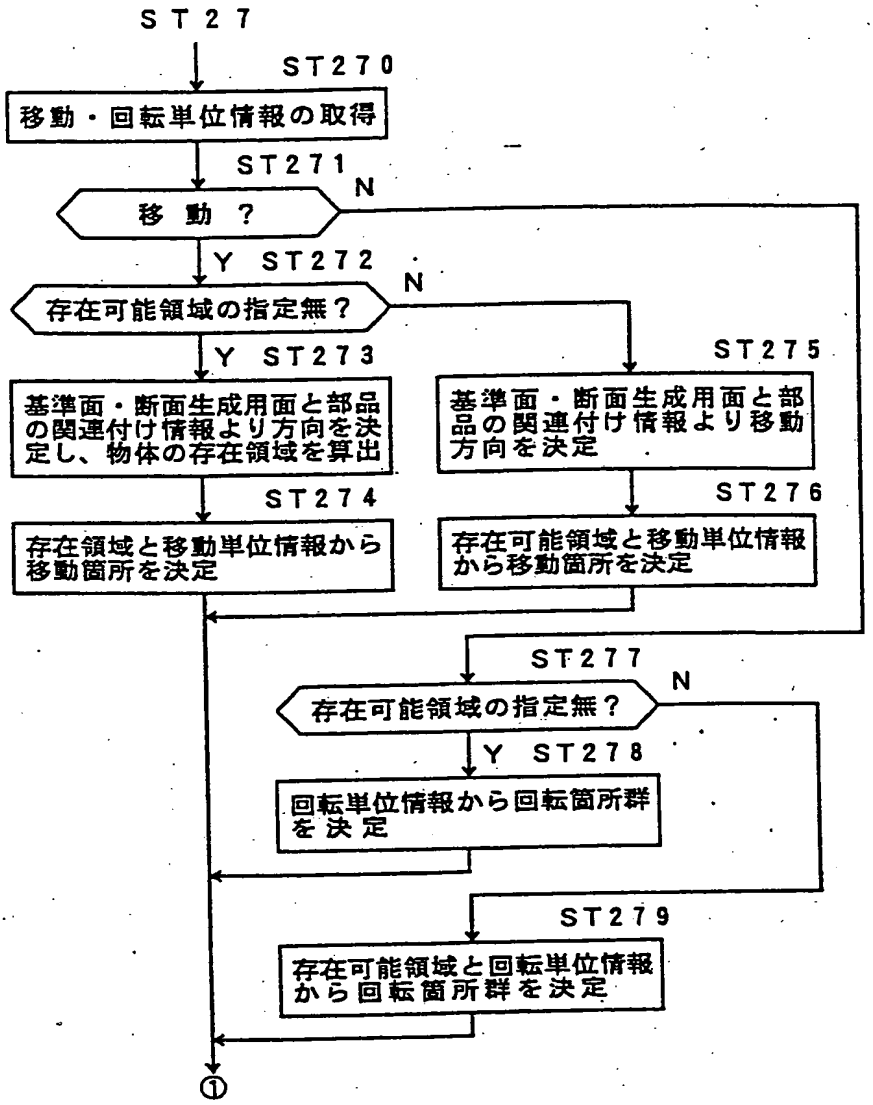
ST 265 Update of contents in virtual three dimensional space

ST265 Generate image data of reference plane / plane for generating cross section by present viewpoint, observing point and window size of image region

ST266 Update display

Figure 53

本発明の実行する処理フロー

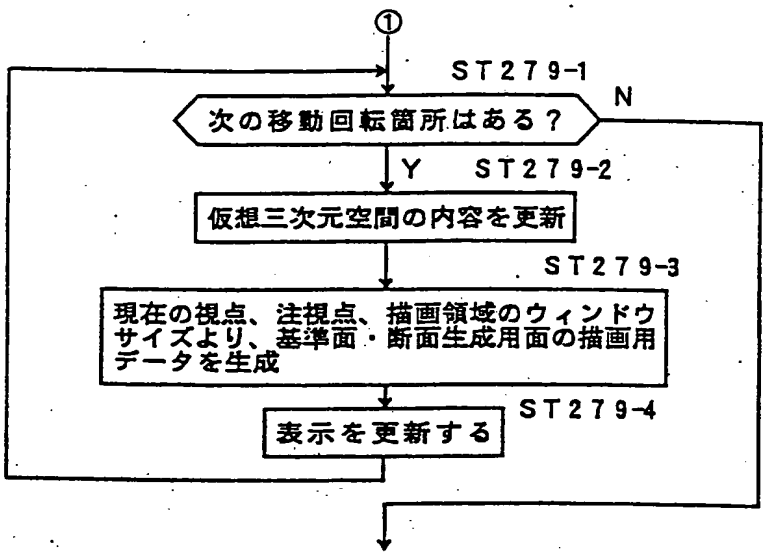


ST270 Take transfer / rotation
ST271 Transfer
ST272 Direction of allowable region of existence is there ?
ST273 Determine direction from reference plane / plane for generating cross section and information of relation of parts, and calculate allowable region of body.
ST274 Determine moved place from the existence region and information of transfer
ST275 Determine direction of transfer place from the existence region and information of relation of parts
ST276 Determine moved place from the existence region and information of transfer unit

ST277 Allowable region of existence
ST278 Determine group of rotation points
ST279 Determine rotation points group from allowable region of existence and information of rotation unit

Figure 54

本発明の実行する処理フロー



ST 279-1 Is there next transfer/rotation point ?

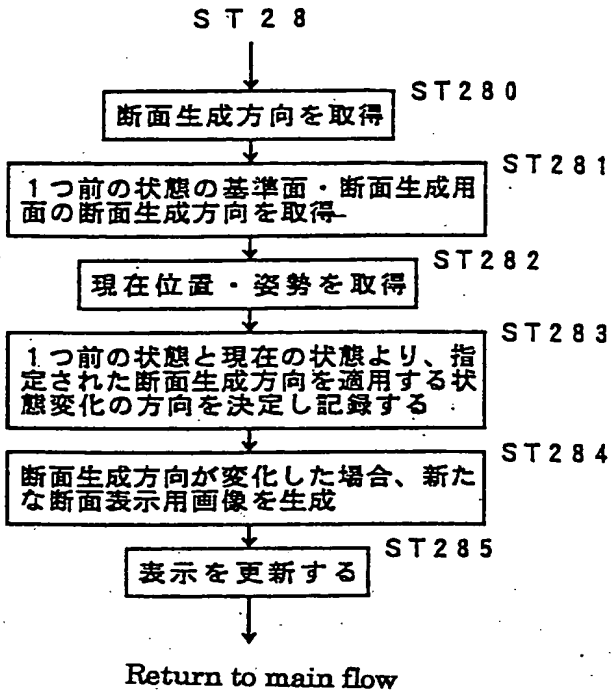
ST279-2 Update contents of virtual three dimension space

ST279-3 Generate image data of reference plane / plane for generating cross section by present viewpoint, observing point and window size of image region

ST279-4 Update display

Figure 55

本発明の実行する処理フロー



ST280 Take direction of cross section

ST281 Take direction generated cross section of just before reference plane / plane for generating cross section

ST282 Take present position / pose

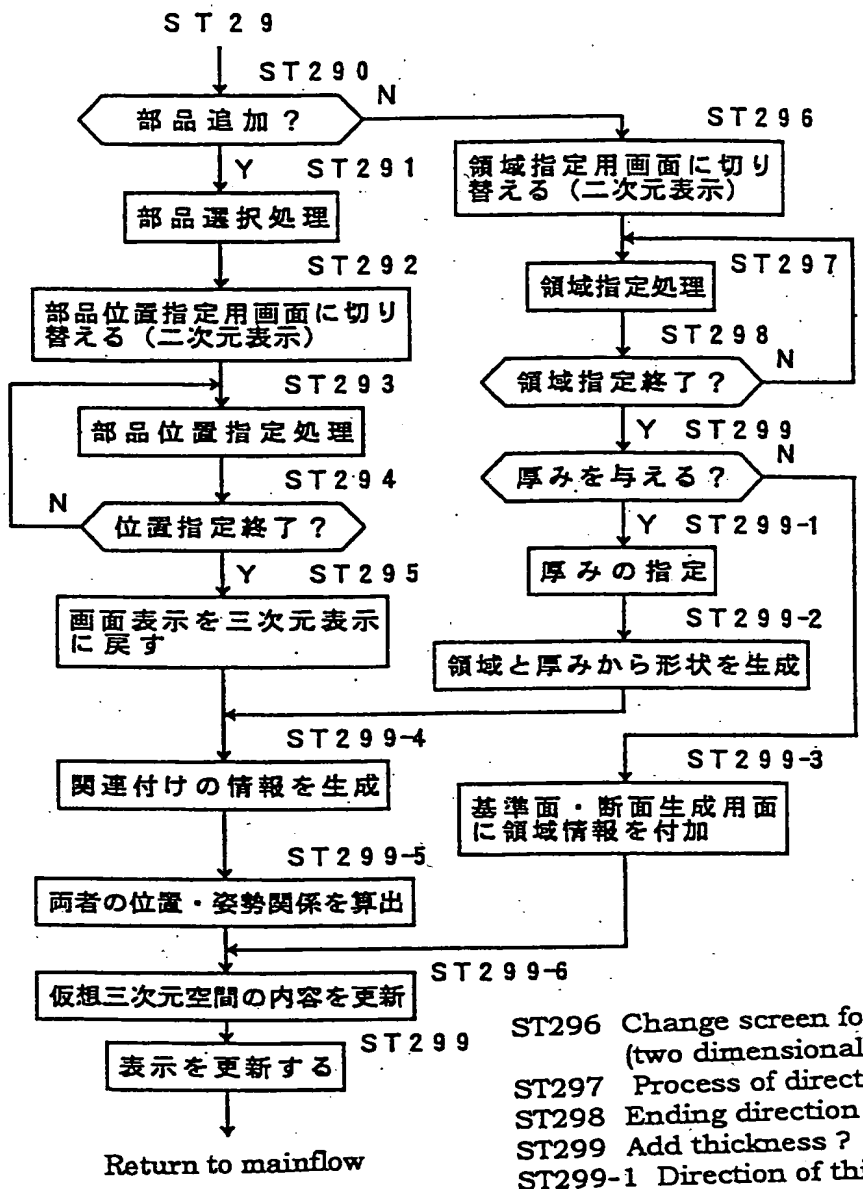
ST283 Determine direction of state change applying the direction for generating cross section from just before state and present state, and register it

ST284 Generate image of new plane for generating in case of direction for generating cross section

ST285 Update display

Figure 56

本発明の実行する処理フロー



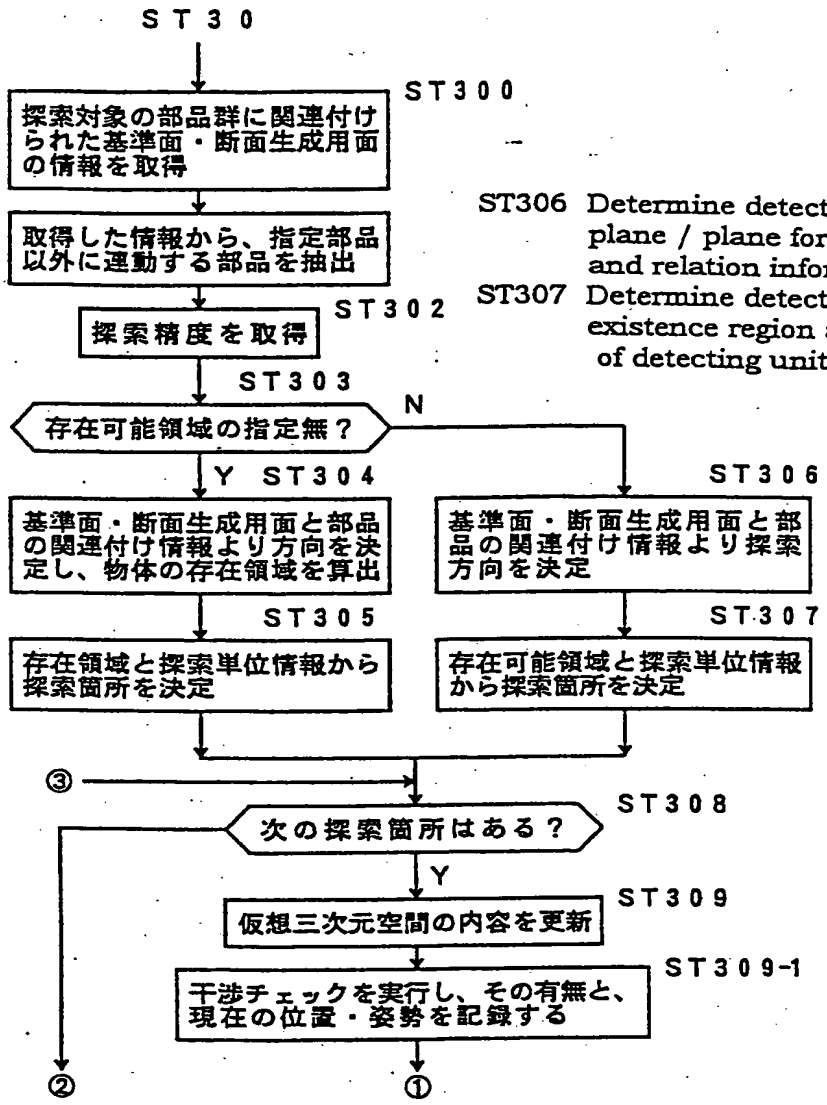
ST290 Add parts ?
ST291 Process selecting parts
ST292 Change screen for directing parts position (for two dimensional display)
ST293 Process for directing parts position
ST294 End of direction of position ?
ST295 Return screen to three dimensional display

ST296 Change screen for directing region (two dimensional)
ST297 Process of direction of region
ST298 Ending direction of region ?
ST299 Add thickness ?
ST299-1 Direction of thickness
ST299-2 Generate form from region and thickness
ST299-3 Add region information to reference plane / plane for generating cross section

ST299-4 Generate information of relation
ST299-5 Calculate position/pose relation thereof
ST299-6 Update contents of virtual three dimensional cross section
ST299-7 Update display

Figure 57

本発明の実行する処理フロー



ST306 Determine detecting direction from reference plane / plane for generating section and relation information of parts

ST307 Determine detecting position existence region and information of detecting unit

ST300 Take information of reference plane / plane for generating cross section

ST301 Extract linked parts directed other than directed parts from obtained information

ST302 Take accuracy of detection

ST303 Is there direction of allowable region of existence ?

ST304 Determine direction from reference plane / plane for generating cross section and relation information of parts, and calculate allowable region of existence

ST305 Determine detecting position from existence region and information of detecting unit

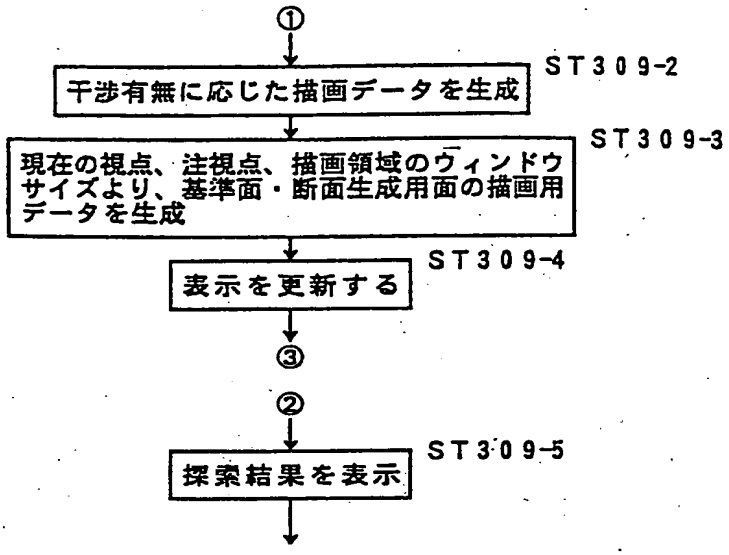
ST308 Is there next detecting position ?

ST309 Update contents of three dimensional cross section.

ST309-1 Execute interference check, and register its existence or no-existence, present position / pose

Figure 58

本発明の実行する処理フロー



ST309-2 Generate image data corresponding to interference

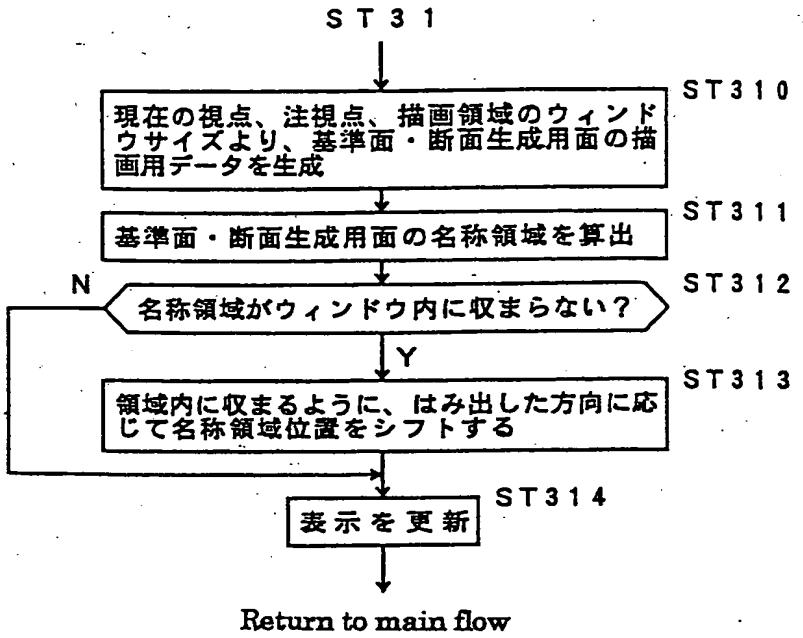
ST309-3 Generate image data of reference plane / plane for generating cross section by present viewpoint, observing point and window size of image region

S309-4 Update display

ST309-5 Display result of detection

Figure 59

本発明の実行する処理フロー



ST310 Generate image data of reference plane / plane for generating cross section by present viewpoint, observing point and window size of image region

ST311 Calculate name regin of reference plane / plane for detecting cross section

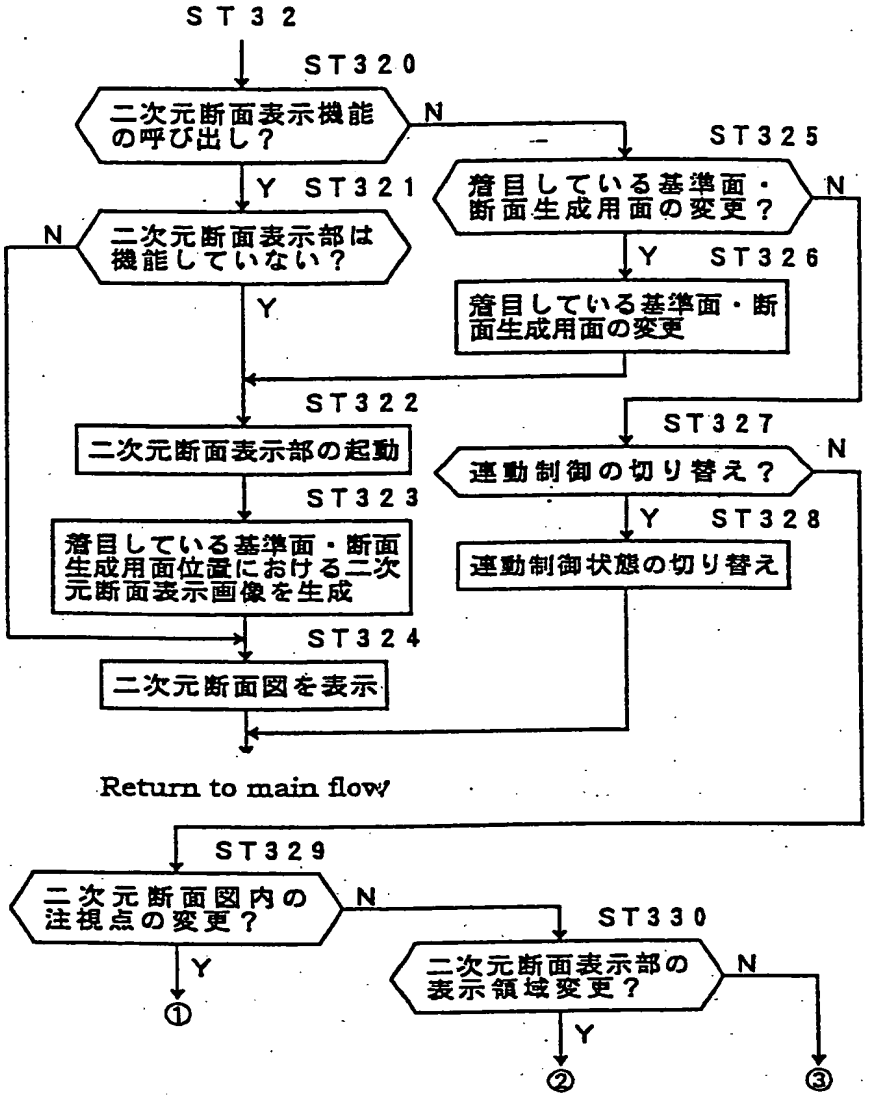
ST312 Name region is within window ?

ST313 Shift the position of the name region for direction determined by overflow direction so as to be positioned within the region

ST314 Update display

Figure 60

本発明の実行する処理フロー



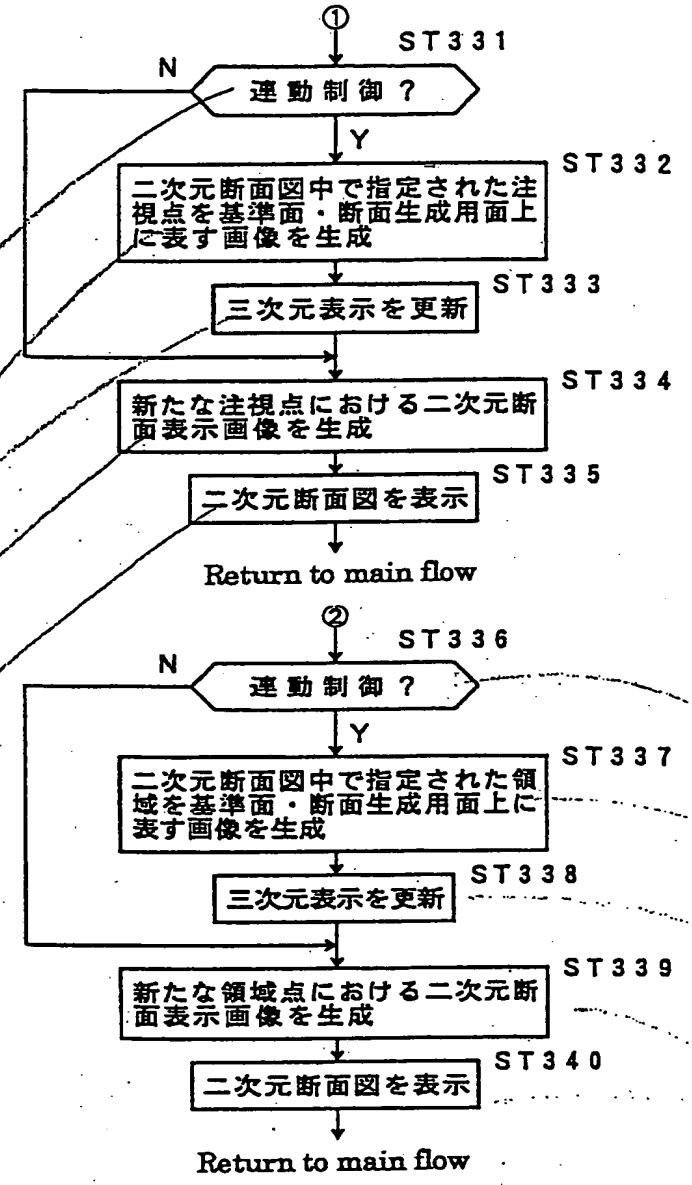
ST320 Calling display function of two dimensional section ?
ST321 Display part of two dimensional section is acting ?
ST322 Act display part of two dimensional cross section
ST323 Generate display image of two dimensional section at the position of reference plane / plane for generating cross section aimed
ST 324 Display two dimensional cross section

ST325 Is there change of reference plane / pla for generating cross section aimed ?
ST326 Change reference plane / plane for generating cross section aimed
ST327 Is there change of link control ?
ST328 Change link control state

ST329 Is there change aimed point in figure of two dimensional cross point
ST330 Is there change of display region of two dimensional cross point

Figure 61

本発明の実行する処理フロー



ST331 Link control ?

ST332 Generate image of observing point directed on two dimensional cross section for displaying on reference plane / plane for generating cross section

ST333 Update three dimensional display

ST334 Generate image for displaying two dimensional cross section at new observed point

ST335 Display two dimensional cross section

ST336 Link control

ST337 Generate image of region directed on two dimensional cross section for displaying on reference plane / plane for generating cross section

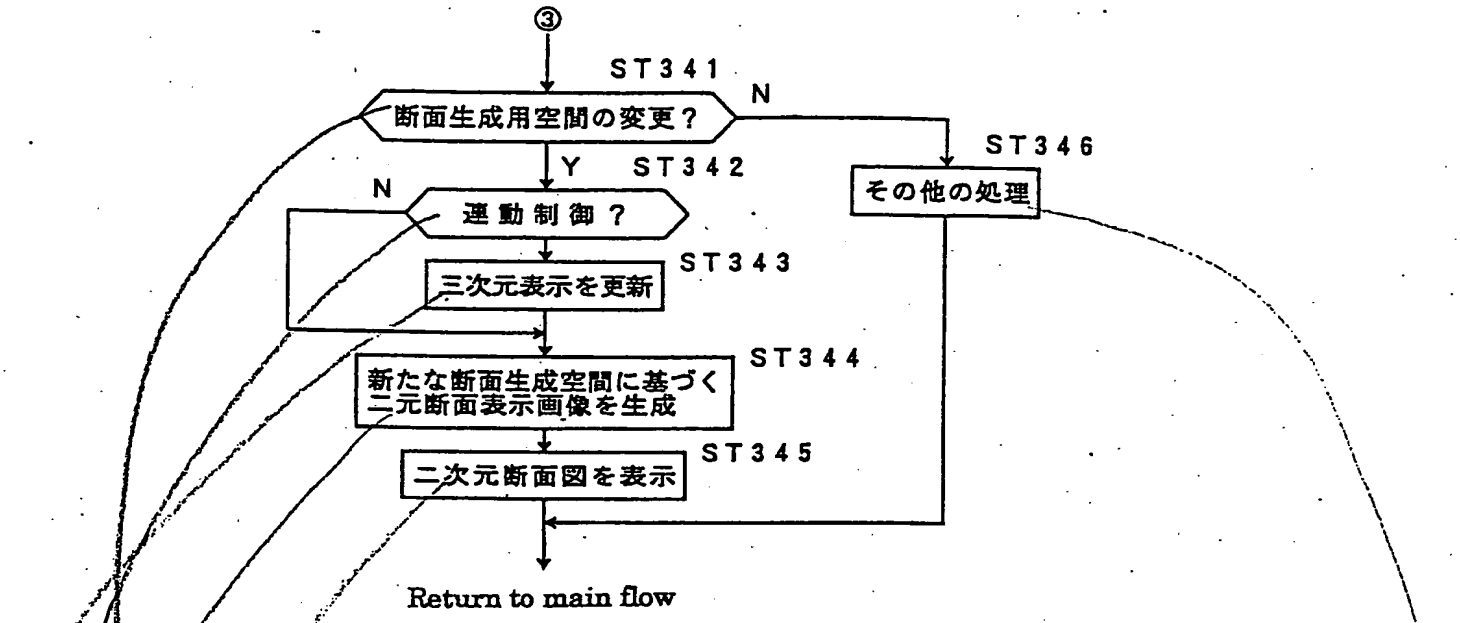
ST338 Update three dimensional display

ST339 Generate image for displaying two dimensional cross section at new observed point

ST340 Display two dimensional cross setion

Figure 62

本発明の実行する処理フロー



ST341 Change of spave for generating cross section ?
ST342 Moving control ?
ST343 Update three dimensional cross section
ST344 Generate image for displaying two dimensional cross section in new space for generating cross section
ST345 Display two dimensional cross section
ST346 Another process